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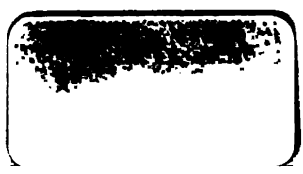

MINUTES OF EVIDENCE

AND

PROCEEDINGS

ON THE

LIVERPOOL AND BIRKENHEAD

Dock Bills

IN THE SESSIONS

OF

1855 AND 1856.

WITH

Plans of Docks and Entrances.

BY

THOMAS WEBSTER, M.A., F.R.S.,

BARRISTER-AT-LAW.

LONDON:

P. S. KING, 12, BRIDGE STREET, WESTMINSTER, S.W.

1857.

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Erratum.

Page 238, for 50,000*l.*, read 850,000*l.*

INTRODUCTION.

In the Session of 1855, the following Bills relating to the Mersey and the Docks at Liverpool and Birkenhead were submitted to Parliament:

1. A Bill for the Conservancy of the Port and Harbour of Liverpool. Conservancy.

By this Bill it was proposed to constitute a Conservancy Board, which should take upon itself—the Conservancy of the Mersey, under the control of the Mersey Conservancy Commissioners, namely, the First Lord of the Admiralty, the Chancellor of the Duchy of Lancaster, and the Chief Commissioner of Woods (as constituted by the 5 & 6 Vict. c. 110)—the powers and liabilities of the Liverpool Corporation, and the Liverpool Dock Trustees, in respect of the maintenance of the Port and Harbour of Liverpool, together with the Town and Anchorage Dues levied by the former, and the Harbour and Light Dues levied by the latter of these bodies.

2. A Bill for authorising the Trustees of the Birkenhead Docks to make and maintain a dock in the South Reserve. South Reserve Dock.

3. and 4. Two Bills for exempting vessels resorting to the Birkenhead Docks and the cargoes thereof from the payment of certain dues to the Trustees of the Liverpool Docks, and to the Mayor, Aldermen, and Burgesses of the Borough of Liverpool respectively. Rates and town dues exemption.

These Bills, one introduced by the Birkenhead Dock Trustees, the other by the Birkenhead Dock Company, had substantially the same object, namely, to relieve vessels discharging in the river, and resorting to Birkenhead without resorting to Liverpool, from payment of dock dues to the Liverpool Dock Trustees, and town dues to the Liverpool Corporation.

5. A Bill vesting the undertaking of the Birkenhead Dock Company in the Trustees of the Birkenhead Docks, for exempting vessels resorting to the Birkenhead Docks, and the cargoes thereof, from the payment of certain dues to the Mayor, Aldermen, and Burgesses of the Borough of Liverpool and the Trustees of the Liverpool Docks respectively. Amalgamation of trusts.

This Bill (which was converted into "The Birkenhead

Docks Act, 1855") proposed—to amalgamate the property of the Birkenhead Dock Trustees with the undertaking of the Birkenhead Dock Company, to vest the whole undertaking in the former body, and to provide for the future amalgamation of these bodies with the Liverpool Dock Trustees—to exempt vessels using the Birkenhead Docks from payment of tonnage dues to the Liverpool Dock Trustees, and town and anchorage dues to the Liverpool Corporation —to provide for one single payment by vessels using both the Liverpool Docks and the Birkenhead Docks, to be afterwards accounted for and divided between the two bodies.

Liverpool Docks Bill.

6. A Bill to authorise the Trustees of the Liverpool Docks to construct new works, and to raise a further sum of money, and for other purposes.

The objects of this Bill were to enable the Trustees to construct new Docks and Warehouses at Liverpool; to make and levy rates for the use of a new communication with the Leeds and Liverpool Canal; to purchase land; to make provisions for the better working and management of the Docks and the control of the vessels, the collection of dues therein, and other purposes; and to borrow the sum of 4,000,000*l.* on the security of all rates and duties payable to the Trustees.

Committee on the Bills.

These several Bills were referred to a Select Committee of the House of Commons, the Right Hon. H. Labouchere being Chairman of the Committee. The Liverpool Docks Bill was first proceeded with. The necessity for further accommodation in the Mersey, especially for vessels of the largest class and greatest draught of water, being conceded, the promoters of the Bill and their adherents contended that such accommodation would be best provided by extending the works to the north, and that the trade afforded adequate security, as successive portions of the 4,000,000*l.* which it was proposed to expend should be brought into productive operation by the completion of works. The representatives of the Birkenhead interests and their adherents contended, on the contrary, that such accommodation could only be adequately provided at Birkenhead; that the Cheshire shore possessed physical advantages as regards depth of water and shelter, with convenience of docking on the weather shore, which nature had denied to the Lancashire shore; that it was impolitic to incur so great an outlay at Liverpool when a greater amount of accommodation could be afforded at much less cost at Birkenhead; and that at least the Birkenhead works ought to be completed before further expenditure should be sanctioned at Liverpool. The Bill was also opposed by commercial, trading, and shipping interests, independent of Liverpool and Bir-

Case of promoters.

Case of opponents.

kenhead, on the grounds that such an addition to the bonded debt of the Liverpool Dock Estate would be dangerous to the solvency of the estate; that the land in the hands of the Dock Committee at Liverpool for dock purposes had not been made available to the extent it might have been; that improved machinery and arrangements would enable the existing docks to afford a greatly increased amount of dock accommodation; that the south, and not the north, was the direction in which the docks ought to be extended on the Lancashire shore, and that the whole question of dock accommodation and of the estuary of the Mersey ought to receive further and more impartial examination than by the professional advisers of the local interests. Case of opponents.

Suggestions in the course of the proceedings before the Committee as to the expediency of the Birkenhead Dock Estate being purchased by or passing into the hands of the Liverpool Dock Trustees, having led to an arrangement for the Liverpool Corporation purchasing the Birkenhead Docks, advantage was taken of one of the other Bills before the Committee for carrying out that arrangement, and resulted in the passing of "The Birkenhead Docks Act, 1855." Suggestions for amalgamation.

The Committee, under this altered state of circumstances, empowered the Trustees of the Liverpool Dock to borrow the sum of 850,000*l.* for the improvement of the existing dock accommodation, the completion of works and warehouses already commenced, and the purchase of land. The Bill so altered became "The Liverpool Dock Act, 1855." The other Bills were not proceeded with.

In the Session of 1856, a Bill "For carrying into effect certain provisions of 'The Birkenhead Docks Act, 1855,' for providing for the construction, completion, and management of the Birkenhead Docks, and for other purposes," was introduced into Parliament, and referred to a Select Committee of the House of Commons, Sir W. Clay, Bart., being Chairman of the Committee. Session of 1856.

By this Bill it was proposed to repeal all the existing Acts relating to the Birkenhead Docks, and to enable the Liverpool Corporation to deviate from the plans known as Mr. Rendel's, or the authorised plans, and to adopt others essentially different in general design, as regards the character of the entrances, or the passages between the Mersey and the Float, the appropriation of the reclaimed land known as the South Reserve, the access of the Railway Companies to the Mersey, and the accommodation to be afforded to those Companies on such Reserve by the Low-water Basin of Mr. Rendel. The Bill also proposed to enable the Liverpool Corporation—to make a railway, and to take tolls, and to lease parts of the Bir- Objects of Bill of 1856. Substitution of other for the authorised works.

Equalisation of rates at Birkenhead and Liverpool.

kenhead Dock Estate; to place the management of such portions of the Docks, as from time to time should be ready to receive shipping, in the hands of the Liverpool Dock Committee; to levy the same rates at the Birkenhead as at the Liverpool Docks, and to apportion the rates paid by vessels using both the Liverpool and the Birkenhead Docks; to manage the Birkenhead Dock Estate, except docks ready for shipping, and to carry the surplus of the monies received from such Estate, after paying expenses and interest on the bonds issued under the Act of last Session and the present Bill, to the Liverpool Borough Fund. It was also proposed to empower the Liverpool Corporation to borrow (in addition to the sum borrowed, or to be borrowed under the Act of last Session, amounting to 1,643,000*l.*) the sum of 450,000*l.* for the purpose of completing the Birkenhead Docks. The Bill also contained other provisions as to the general management and regulation of the Birkenhead Dock Estate.

Additional borrowing powers.

Case of opponents.

This Bill was opposed as a violation of the arrangements and engagements upon the faith of which, since 1844, large sums of money had been expended; as depriving the Railway Companies of a station upon, and free communication with, the Mersey, and as subjecting the trade to charges from which it was to have been free; as substituting works which, in comparison with the authorised works, would obstruct access to the Float, and the development of the land on the margin, and at the top, of Wallasey Pool.

Evidence as to the plans.

The attention of the Committee was directed almost exclusively to a comparison of the plans for the entrances or passages between the Mersey and the Float as then first proposed by Mr. Hartley in substitution for the plans of Mr. Rendel, as authorised by Parliament. The Committee, having heard all the evidence of the promoters in support of the proposed in preference to the authorised plans, and the evidence of Mr. Rendel alone in support of the authorised in preference to the proposed plans, declared their opinion that the preamble of the Bill was not proved, thus upon the question of works affirming or coinciding with the uniform tenor since 1843 of the decisions of every Committee of both Houses of Parliament, of the Surveying Officers of the Admiralty, of the Lords Conservators of the Mersey, and of the Inquiry before Admiral Beaufort and Mr. Robert Stephenson, as to the character of the entrances by which the enormous capabilities of Wallasey Pool, and the natural advantages of the Cheshire shore, could be best adapted for the accommodation of the trade of the Mersey.

EVIDENCE IN THE HOUSE OF COMMONS,

SESSION, 1855.

LIVERPOOL DOCKS BILL.

IN THE HOUSE OF COMMONS.

Thursday, 22nd March, 1855.

THE RIGHT HONOURABLE HENRY LABOUCHERE IN THE CHAIR.

Mr. Hope Scott, Mr. Merewether, Mr. Webster, and Mr. Burke, appeared as counsel, and Messrs. Dorrington and Co. as agents, for the Bill.

Mr. Calvert and Mr. Goldsmid appeared as counsel, and Mr. Stephens as agent, on the petition of the Birkenhead Dock Company, against the Bill.

Mr. Calvert and Mr. Goldsmid appeared as counsel, and Messrs. Bircham and Co. as agents, on the petition of the Trustees of the Birkenhead Docks, against the Bill.

Mr. Serjeant Wrangham and Mr. Hardy appeared as counsel, and Mr. Stephens as agent, on the petition of merchants, shipowners, masters of vessels, and others, against the Bill.

Mr. Serjeant Wrangham and Mr. Hardy appeared as counsel, and Mr. Stephens as agent, on the petition of bondholders of the Liverpool Docks, against the Bill.

Mr. Serjeant Wrangham and Mr. Rodwell appeared as counsel, and Messrs. Pritt and Co. as agents, on the petition of the Earl of Derby, against the Bill.

Petitions against.

The following petitions—Of owners of lands at Poulton, Messrs. Gregory as agents; the Lancashire and Yorkshire Railway Company, Messrs. Pritt and Co. as agents; the Birkenhead Improvement Commissioners, Messrs. Pritt and Co. as agents; the Leeds and Liverpool Canal, Messrs. Pritt and Co. as agents; the Corporation of Manchester, Messrs. Pritt and Co. as agents; Mr. Jack, Messrs. Pritt and Co. as agents—were appeared on against the Bill.

Mr. Hope Scott was heard to open the case for the Bill.

Friday, 23rd March, 1855.

THE RIGHT HONOURABLE HENRY LABOUCHERE IN THE CHAIR.

T. Baines, 23 Mar., 1855.

Thomas Baines, examined by Mr. Merewether.

I am the son of the late Member for Leeds, and brother of the Chief Commissioner for Poor Laws. I am resident at Liverpool, and, as proprietor and editor of a newspaper there, have had my attention drawn to public official matters at Liverpool, and to the progress of the port. Those circumstances induced me to publish a history of Liverpool, and to collect by every means in my power information as to the ancient and modern history of Liverpool, and, as the result, I can lay before the Committee statistical facts arranged in tables.

Table No. 1 is a statement for the years mentioned of the value of the principal manufactured goods of the country exported through Liverpool to foreign countries (excluding minor articles and the coasting trade):

TABLE No. 1.

Years.	Amount.	Years.	Amount.
	£		£
1839.....	25,703,847	1851.....	37,918,640
1845.....	28,427,767	1852.....	38,460,500
1850.....	34,891,847	1853.....	47,152,194

Table No. 2 is a statement of the value of the exports from the various ports undermentioned in the year 1853:

TABLE No. 2.

		The Clyde.	
London.	Hull.	Glasgow.	Greenock.
£	£	£	£
22,991,082	10,788,780	4,968,630	437,522

The value of the whole exports in 1853, from the above ports, amounted to 91,549,388*l.*; of which Liverpool amounted to 47,152,194*l.*

The value of the cotton in 1825 amounted to 706,000*l.*; and in 1854, to 2,065,000*l.*

Table No. 3 is a statement of the import of cotton into Liverpool in the years mentioned:

T. Baines,
23 Mar., 1855.

TABLE No. 3.

Years.	Bales.	Years.	Bales.
1825.....	706,316	1840.....	1,415,341
1826.....	489,204	1841.....	1,164,269
1827.....	756,296	1842.....	1,249,811
1828.....	630,245	1843.....	1,557,597
1829.....	640,998	1844.....	1,490,984
1830.....	793,605	1845.....	1,652,731
1831.....	791,582	1846.....	1,134,194
1832.....	779,071	1847.....	1,087,058
1833.....	840,953	1848.....	1,568,000
1834.....	841,474	1849.....	1,732,700
1835.....	970,717	1850.....	1,573,100
1836.....	1,023,587	1851.....	1,748,946
1837.....	1,036,005	1852.....	2,205,700
1838.....	1,328,415	1853.....	2,028,400
1839.....	1,019,229	1854.....	2,065,700

Table No. 4 is a statement of the weekly consumption of cotton in Great Britain in the years mentioned:

TABLE No. 4.

Years.	Bales.	Years.	Bales.
1825.....	11,531	1845	30,277
1830.....	16,002	1850.....	29,125
1835.....	18,348	1854.....	37,829
1840.....	24,063		

Table No. 5 is a statement of cotton exported from Liverpool and supplied to the Continent in the years mentioned:

TABLE No. 5.

Years.	Bales.	Years.	Bales.
1825.....	72,800	1845.....	122,800
1830.....	33,400	1850.....	271,800
1835.....	102,800	1854.....	316,000
1840.....	119,700		

Table No. 6 is a statement of the value of the various trades of Liverpool in the year 1853:

TABLE No. 6.

Trades.	£	Trades.	£
Corn	5,000,000	Timber	1,300,000
Cattle.....	2,600,000	Olive Oil.....	1,250,000
Wool	1,850,000	Iron.....	1,198,000
Fish Oils	1,500,000	Butter.....	1,188,000
Sugar	1,380,000	Tea	1,000,000

Table No. 7 is a statement of the average amount of tonnage of vessels which entered the port of Liverpool in the periods mentioned:

TABLE No. 7.

Years.	Tonnage.
From 1826 to 1830	1,312,932
„ 1831 „ 1835	1,636,993
„ 1836 „ 1840	2,107,440
„ 1841 „ 1845	2,589,060
„ 1846 „ 1850	3,381,686
„ 1851 „ 1854	3,964,184
From 24th June, 1853, to 24th June, 1854...	4,316,583

T. Baines, 23 Mar., 1855.

Table No. 8 is a statement of the average amount of the steam tonnage of vessels which entered the port of Liverpool in the years mentioned (taken in periods of five years):

TABLE No. 8.

Years.	Tonnage.	Years.	Tonnage.
From 1826 to 1830.....	262,562	From 1841 to 1845.....	840,114
„ 1831 „ 1835.....	385.937	„ 1846 „ 1850..... ...	1,163,067
„ 1836 „ 1840.....	664,761	„ 1851 „ 1854.....	1,319,598

Table No. 9 is a statement of the contribution to the Dock Revenue by commercial countries in the various branches of trade carried on in Liverpool from 25th June, 1853, to 24th June, 1854:

TABLE No. 9.

Countries.	Amounts.	Countries.	Amounts.
	£		£
The United States	148,565	West Indies and Gulf of Mexico	10,874
British America	32,609	Brazils	9,150
Coasting Trade of British Islands	25,693	The Baltic	9,456
East Indies and China.....	24,508	West Coast of South America..	5,925
Mediterranean and Black Sea...	23,113	New South Wales and New Zealand	4,437
European Ports between the Straits of Gibraltar and the entrance to the Baltic.....	15,554	West Coast of Africa	4,931

Table No. 10 is a list of ports with which Liverpool has commenced dealings, with the progress and the amount of the trade. The number of ports with which Liverpool traded in the last complete year, scattered over the world, is 497. I compiled it with a view to show the diffusion and variety of the trade at Liverpool.

Table No. 11 is a statement of the yearly average of the Dock Revenue from tonnage and goods for the years mentioned:

TABLE No. 11.

Years.	Amounts.	Years.	Amounts.
	£		£
1826 to 1830	141,105	1846 to 1850	218,188
1831 „ 1835	185,369	1851 „ 1854	259,248
1836 „ 1840	175,377	And that in the year 1854 ...	298,078
1841 „ 1845	189,886		

There were reductions made in the years 1836, 1844, and 1848.

Reduction of dues.

There was a very large reduction in 1836, equivalent to about 38 per cent. upon the whole amount of dues raised, being a reduction of from 80,000*l.* to 90,000*l.*, and it made a diminution of about 10,000*l.* in the next average of five years, and was then nearly replaced by the increase.

Table No. 12 is a statement of number of bales of cotton forwarded from Liverpool to the interior, by the following conveyances, in the year 1853:

T. Baines, 23 Mar., 1855.

TABLE No. 12.

Conveyance.	Bales.
London and North Western Railway.....	589,182
Lancashire and Yorkshire Railway	510,683
East Lancashire Railway.....	143,356
Leeds and Liverpool Canal	68,234
The High Road	12,580
Total.....	1,324,035

Cross-examined by Mr. Serjeant Wrangham. *Cross-examination.*

The table No. 1 is from a Parliamentary return of vessels and tonnage [number 656]. I do not know whether that includes all goods exported from Liverpool, or all goods exported through the docks; I have no doubt it is from the port of Liverpool. No. 2 is from the same Parliamentary return. Table No. 4, the statement of the weekly consumption of cotton in Great Britain, is from Mr. George Holt's yearly circular. Table No. 5, the statement of cotton exported from Liverpool, is from the same Mr. Holt's circular. Table No. 6, the value of various trades in Liverpool, is from a book published by Mr. Braithwaite Poole, entitled the "Commerce of Liverpool."

Tables Nos. 7 to 9 are from the published accounts of the Liverpool Dock Trust. The table of steam tonnage is merely the tonnage coming from other ports, it does not include the ferry steamers or the steam tugs. It includes everything that passes through the Custom House.

There is a great difference of opinion in the press at Liverpool about the proposed scheme, and it is pretty warmly discussed.

The year ending June, 1854, is an extraordinary contrast to other years; it is much more than the average. The Australian trade particularly tended to swell that year. In the six latter months of the year, ending the 31st December, 1854, there has been considerable falling off.

Charles Turner, examined by Mr. Merewether. *C. Turner,* 23 Mar., 1855.

I have been chairman of the Dock Committee for the last four years, and a member of the Dock Committee since November, 1850. I have also been very largely engaged in the East India trade since the year 1829. I think I have as good a knowledge as most men of the trade of Liverpool, and of the position, financial and otherwise, of the docks.

The Dock Estate at present consists of 191 acres of water space, according to the surveyor's measurement, in docks. The basin space is 16 acres; the quay space, 129½ acres, with 13 lineal miles of quay. The Dock Estate is managed by an honorary Committee of twenty-four members. The constitution was settled by Act of 1851, which enacted *Dock Committee.*

C. Turner, 23 Mar., 1855.

that twelve of its members should be chosen by the ratepayers, and twelve by the Corporation of Liverpool; the twenty-four so elected having power to choose their own chairman, who must be a member of the Corporation. The constitution of 1851 reduced the influence of the Corporation in the Dock Committee and increased the influence of the ratepayers; previous to that the Corporation chose the chairman of the Dock Committee, besides having a numerical majority in the Dock Committee. The trust is carried on entirely for the benefit of the public. No body, either public or private, has the slightest interest in the proceeds of the estate. The members, chosen by the Corporation and by the ratepayers, act harmoniously together. There has not been the slightest distinction between them since I have been chairman, and I have been so since the first constitution of the present trust. There has been, of course, a difference of opinion among the members, but nothing like a class distinction.

The last year's revenue of the Dock Estate was 385,312*l.*, leaving a surplus, after the expenses of management and maintenance, of 69,090*l.*, notwithstanding the fact that since 1826 there have been three periods of reduction, but for which the surplus would have been considerably more of course. We have a discretion by our Dock Acts as to reduction; a discretion, but not an obligation. It is the intent of our Dock Acts that revenue should be as applicable to expenditure for works as capital, so that the tendency and direction of our receipts is for the public end of improving and maintaining the docks. I have heard no complaint whatever on the subject of the rates. I think the rates charged have generally given satisfaction. I am not aware of any complaint of the rates being too high. It is difficult to compare the rates at Liverpool with those of other commercial towns, inasmuch as they are differently levied in the different places. I believe the impression in the mercantile body is that the rates at Liverpool, taken as a rule, are lower than at other places. In London the rates are levied upon ships, and upon warehouses, and upon different matters; it is very difficult to institute a direct comparison. In Liverpool we only charge one rate upon the vessel coming in, and she pays nothing on going out, while in London they have a rate inwards and a rate outwards, and a rent for a certain period, which is not charged in Liverpool, at least the time which the inward rate allows them to pass in Liverpool is so large that there is seldom a vessel upon rent; the mercantile body are quite satisfied with the rates, and Liverpool is to be considered a place where the rates are lower than in other places. I have never heard of any complaint from anybody as to the amount of our rates.

Revenue applicable to works.

Liverpool dock-dues lower generally than others.

The town dues are perfectly distinct from the dock rates; we have nothing to do with the town rates, nor has the Corporation anything to do with the dock rates, the two corporations are perfectly distinct in regard to that matter. The Corporation receives its own town dues perfectly separate from the docks; we have nothing to do with its town

Town and dock-dues distinct.

dues, and the Corporation has nothing to do with our dock dues; they have no connexion whatever. The Manchester petition says, "in addition to such rates, of which your petitioners do not complain;" there is no complaint of the dock rates. *C. Turner*, 23 Mar., 1855.

It is very difficult to form any accurate calculation as to the amount of expenditure. The early history of the expenditure is very indistinct; it is not to be ascertained with accuracy. It is almost impossible. You may get the gross income from the first, but it is very difficult to ascertain what the actual money expended on the works has been. (*a*) The bond debt is about 5,200,000*l.* in round numbers. There is no question that the expenditure is a very much larger amount. I should think nearly double, but not quite perhaps. The tables of Mr. Baines as to the average tonnage and the steam tonnage, and so far as they relate to dock matters, are, I believe, correct. Expenditure on docks not ascertained.

The extension now proposed is necessary and desirable for the trade of the United Kingdom which comes to Liverpool. What we are proposing to do now is a completion of the Act of 1848. To the eastward of course it is an extension, but northward, and as regards the river frontage, it is merely a completion of the Act of 1848. We do not alter the river front in the slightest degree beyond what was settled by the Act of 1848. With the exception of a space left for the convenience of access to the works, the river wall as sanctioned in 1848 is complete; the two ends are complete, the northern end is complete, and the small vacancy which is left is an intermediate space. There are powers under the Act of 1848 to complete the river wall as far as it is shown upon the river front, which is not to be altered, and to make docks upon the whole of the part which is marked blue. These vacancies would have been completed but for the convenience of formation, and the requirements of the port making it necessary to make docks elsewhere; in the mean time we have been obliged to attend to other works of more pressing importance. This Bill does not give any fresh power as affecting the river front, or any part of that land which is coloured blue. Completion of works authorised.

Under the Act of 1848 we were compelled to make for Lord Derby the pieces of land marked A B C and D, in consideration of his giving us the land coloured blue, which I think is about 207 acres; we acquired 207 acres of land from Lord Derby, on the condition that we were to make those blocks of land A B C and D. It is one of the arrangements of this Bill that we should purchase that land of Lord Derby. When the Committee looked at the whole of the question, with a view of doing what was best for the existing and prospective wants of the port, the timber trade came before the Committee for consideration, among other matters; and upon a consultation with the timber trade and the whole of the other trades of the port, it was found Arrangements with Lord Derby.

(*a*) See Evidence in House of Commons on Liverpool Docks Bill, 5 April, 1848, Webster's Report, pp. 6 and 15, and Introduction, p. vi.

C. Turner, 23 Mar., 1855.

that better accommodation and greater facilities than they could have at the south end were especially wanted for the timber trade. It was found that the land marked blue without the acquisition of the land marked pink, which we were to make for Lord Derby, would not be sufficient for the wants of the trade—that there was not sufficient depth from the river upon the land marked blue to make docks for the timber trade and to give them such conveniences as were absolutely necessary. Therefore the Committee, which sat from the beginning of January till the end of July of last year, after considering the matter in all its forms, thought it was desirable to make a conditional arrangement with Lord Derby for the purchase of those blocks of land; in fact, it was absolutely necessary to do it, if we were to make those docks upon the land marked blue which are absolutely necessary for the convenience of the trade intended to be located there.

Removal of the timber trade to the north.

By the Act of 1848 it was intended that the timber trade should come there, but there was considerable opposition at that time. I believe the opposition is now entirely removed, or nearly so, and the timber trade, provided they can have those facilities we shall give them if this Act is carried out, will be quite willing to remove there. That agitation was a matter of local feeling and for local reasons. A good deal of the feeling arose from parties thinking it would interfere with the value of property in the neighbourhood. Whatever it may have arisen from, I believe the parties now are quite willing as a body to remove to the north end. It will be of course a matter of choice with them.

There is some land (coloured yellow) at the back of Lord Derby's, which it is proposed to take under the usual powers of an Act of Parliament, the property of various owners. There is also some land belonging to Mr. John Shaw Lee which it is considered desirable to take, and which has been taken under a conditional arrangement, provided it is sanctioned by Parliament. The land at Liverpool is increasing not only in value, but in occupation; it is everywhere getting in great demand. We have been able to get this land under very favourable circumstances. As regards the land of Lord Derby, it would be perfect madness for the Dock Committee to make docks upon the land marked blue without the acquisition of that land. I am satisfied that the sale as it at present stands is an equitable one on both sides. If we were to carry out works upon the land marked blue, the land marked pink would be so necessary and so valuable for warehouses connected with the docks that it would be doubled in value: it would be worth twice as much as we are giving for it. It would have been, no doubt, desirable that we should have acquired the land marked yellow in the same way that we have the other, by arrangement with Lord Derby and Mr. Lee; but it belongs to so many individuals it is impossible. I have no doubt the whole of that land will be increased in value if we make our docks there. We wish to acquire the land necessary for dock pur-

poses now, that we may not, having made the land more valuable, have to pay an increased value for it. *C. Turner*, 23 Mar., 1855.

The necessity of fresh dock extension has been forced upon the Dock Committee. It became so pressing that they appointed a special sub-committee for the purpose of considering it. I am an *ex-officio* member of all the Committees, and of that among the rest, and I considered it my duty to attend that Committee regularly; that Committee devoted their attention to the subject during about seven months. We consulted everybody we thought likely to have any knowledge of the subject. Our only object was the benefit of the public, and our desire was to do that alone which would be for the benefit of the public, and we neglected no means which would in our opinion conduce to that. That Committee was appointed in January last year. This subject was considered by us in the year 1853; though no Committee was appointed upon the subject until 1854, it was more or less under the consideration of the Dock Committee during the greater part of 1853. I have no doubt that the steady increase of the trade of Liverpool justifies the proposed extension, looking at everything which has, and is likely, to come to pass. This is the Report made from the sub-committee to the Dock Committee, afterwards confirmed by the Dock Committee and by the Town Council. Docks Nos. 1 and 2 are intended for the timber trade; Nos. 3, 4, and 5 for the steam and general trade. Necessity of further dock accommodation.

One great necessity for these docks is the steam trade. The Huskisson Dock had reference to the steam trade. The entrance to that dock was made eighty feet wide in consequence, and it is now found too small for the prospective wants of the steam trade. There is a lock constructing which is 100 feet wide and 500 feet long; it will take a vessel of 4000 tons, I should think; it depends upon the length and the width; it would not take in the large vessel they are now building at Blackwall. The Huskisson Dock was made 15 acres; it was made in 1851 or 1852. The Cunard steamers occupy the whole of the west side of that dock, and they tell us that in a few years—in fact they tell us now—that if a large number of vessels were not taken up by the Government, they would require the whole of the dock. They occupy the whole of the west side, and we have built very large sheds for them; they are two-story sheds, built for their express accommodation. We should have extended them beyond the fort, but we are not allowed to build anything between the fort and the dock. Requirements of the steam trade.

The application of the screw is increasing very much, and will still further increase, no doubt. We have had a great many applications indeed for appropriated berths. The applications made during the last two years have been very numerous, and several of them we have not been able to grant at all. Two of them are from parties who have been over to the Birkenhead side, and they have applied to come to Liverpool; they find it does not answer their purpose. The applications for appropriated berths are generally from lines of steamers. Increase of screw steamers.

C. Turner, 23 Mar., 1855. Trial of Birkenhead.

The Canadian and Brazilian Companies tried Birkenhead, and find that it does not answer their purpose, but they have applied for berths in Liverpool; we are not able to give them berths. We cannot tell the reason for Birkenhead not suiting them, more than guess-work. I fancy they had a difficulty with their passengers; it is merely a guess. They did not state to us any reason, but generally it did not answer their purpose, and they could do better on the Liverpool side. They actually tried Birkenhead. I forget whether they came across or not. They were at Birkenhead when they applied for berths at Liverpool, and they stated that they should be glad to remove the steamers from Birkenhead to Liverpool, because they preferred being on the Liverpool side; they found it would answer their purpose better. We did not enter into the particulars with them. Steam-boats must have quay berths; they cannot load, like sailing vessels, over each other, therefore they require more lineal quay space.

Tonnage of steamers.

The average tonnage in steamers in the year 1851, and from 1851 to 1854, was 1,319,598 tons; in the years 1826 to 1831 the average was only 262,562 tons per annum; from 1851 to 1854 the average is 1,319,598 tons per annum, being nearly five times as much. Besides increasing in numbers, the steamers are increasing very much in size. The Cunard Company are complaining to us of the size of the Huskisson Dock, because they are building some steamers which they stated to us would not be able to get through the gates of the Graving Dock, where the entrance is about 76 feet.

Loss from unoccupied land.

The loss to the Trustees from the non-use of that land at the Harrington Dock is about 12,000*l.* a year. By being obliged to leave that land waste for the timber trade, we are losing nearly 12,000*l.* a year. If by this extension we have another place for the timber trade, we could utilise our land and earn the 12,000*l.* a year, and a great deal more, and we could apply that dock space more usefully to the general trade than to the timber trade. From consultation with the timber trade, I think we could give them facilities at the north end, which would make it much more advantageous to them than remaining at the south end.

Warehouses.

Warehouse room is another feature of our plan. We were obliged to use the money raised under the Act of 1848 for general purposes. The warehouses we have built since 1848 are the north stack at the Stanley Warehouses, which cost about 80,000*l.*, and we are now building a stack upon the south side, which will cost about the same; we are also building a stack of warehouses upon the east side of new Wapping Dock. Those are the only warehouses.

Docks for large steamers

The Huskisson Dock was one of the docks for general purposes. The making of that dock was forced upon us by the necessity of the steam trade. I do not know what we could have done without it; it is the only dock that the Collins steamers can get into. The width of the entrance into the Huskisson Dock is 80 feet. We found in the preparation of new docks it was very desirable to prepare for a larger kind of

vessel, and we have made a lock of 100 feet wide, which goes into No. 2, and it is 500 feet long. There is no doubt that 70 or 80 feet would be large enough for the ordinary run of steamers. *C. Turner*, 23 Mar., 1855

We do not want any fresh powers under this Bill for the purpose of building warehouses. It is proposed to expend in the erection of warehouses about 952,000*l.* They pay us a very handsome return—about 7 per cent.—and that upon the best mode of construction. The Albert Dock Warehouses are very expensively constructed. A great deal of the ground was piled; upon more favourable ground warehouses would be less costly. That per-centage is after allowing for all expenses, repairs, and rates; though the docks are not rated, the warehouses are. We did insure, but have now determined to insure ourselves. As we shall have a large mass of property, we have determined to take our own risk. In a fire-proof building, built as the warehouses are, the repair is not a very great element; the surveyor will tell you exactly what it is. Our experience of the return of the expenditure for building warehouses gives us every reason to believe that the proposed warehouses will pay as well; they have done so hitherto.

In the year 1841, when we obtained power to construct the Albert Dock and Warehouses, our power of borrowing was 1,400,000*l.*; 69,000*l.* of that was then unborrowed; therefore our bond debt would be short by that amount. The year 1841 makes a convenient starting point for describing the financial position of the docks. Starting from that, I have had the following account compiled:

RETURN, showing the gross yearly Income of the Estate of the Liverpool Docks, from the 24th of June, 1841, to the 24th of June, 1854, the amount of Interest paid on Bond Debt, Cost of Repairs, Maintenance, and Incidental Charges, and Net Surplus during the same period.

Years.	Gross Income.	Amount of Interest paid.	Cost of Repairs.	Maintenance and Incidental Charges.	Net Surplus.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1842...	204,830 13 10	53,129 2 0	26,792 4 9	38,737 1 4	86,172 5 9
1843...	217,632 1 3	61,175 2 2	25,978 15 9	48,875 1 9	81,603 1 7
1844...	212,189 19 4	70,993 8 5	24,451 0 4	46,505 7 2	70,240 3 5
1845...	258,699 2 11	82,822 4 9	21,338 1 9	37,736 6 2	116,802 10 3
1846...	247,780 13 6	97,075 3 3	18,394 6 7	53,776 11 7	78,534 12 1
1847...	285,713 17 11	104,364 13 6	26,023 13 2	43,790 4 3	111,535 7 0
1848...	238,180 14 8	134,772 18 5	20,048 6 7	62,836 15 6	20,522 14 2
1849...	273,328 15 0	156,686 0 9	20,610 3 7	69,528 4 0	26,504 6 8
1850...	272,434 15 7	172,027 11 9	22,801 0 0	65,159 5 5	12,446 18 5
1851...	301,970 19 7	189,792 19 8	22,014 17 1	64,927 15 7	25,235 7 3
1852...	320,224 8 4	202,654 13 3	32,893 14 6	68,321 6 2	16,354 14 5
1853...	332,380 1 7	209,487 18 2	43,831 12 11	70,495 8 0	8,565 2 6
1854...	385,312 7 3	205,267 17 11	38,288 17 11	72,664 16 6	69,090 14 11
Total	3,550,678 10 9	1,740,249 14 0	343,466 14 11	743,354 8 5	723,607 18 5

The net surplus of 1854 is 69,090*l.*, which, if we had been a private company, would have gone in dividend; as it is, it has been laid out for the benefit of the trade. That is one of the many distinctions in our Income and expenditure.

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position; there is nothing taken from the Dock Estate for any purpose but for the benefit of the public.

Monies raised, and appropriation.

The following table shows the Acts under which the money was raised, and the spot at which it was expended:

PRINCIPAL received during same period.

	£	s.	d.	£	s.	d.
Amount borrowed from June 24th, 1841, to June 24th, 1854, viz.:						
Under Dock Act, 11 Geo. 4, cap. 14, not previously raised				69,735	3	4
Do. 4 Vic., cap. 30				884,000	0	0
Do. 7 and 8 Vic., cap. 80				1,500,000	0	0
Do. 9 and 10 Vic., cap. 109				1,000,000	0	0
Do. 11 Vic. cap. 10, authorised...	500,000	0	0			
Less amount not raised on the 24th of June, 1854	64,811	12	3			
				435,188	7	9
				3,888,923	11	1
Add amount of surplus income from 1841 to 1854				723,607	18	5
Do. proceeds of sale of old building materials				13,412	2	0
				4,625,943	11	6
Deduct amount in banker's and treasurer's hands unexpended June 24, 1854	191,822	9	1			
Less do. do. June 24, 1851	37,087	8	1			
				154,735	1	0
						4,471,208 10 6

EXPENDITURE during same period.

	£	s.	d.	£	s.	d.
Purchase of property, viz.:						
Under Dock Act, 4 Victoria				260,865	18	1
Do. 7 and 8 do. (North)	515,815	10	1			
Do. 7 and 8 do. (South)	219,785	17	2			
				735,601	7	3
Do. 9 and 10 do. (Wapping)	509,545	4	9			
Do. 9 and 10 do. (Nova Scotia)	119,395	15	8			
				629,341	0	5
Do. 11 do. (State Yards)	26,437	10	7			
Do. 11 do. (Spurling-street)	20,563	9	4			
				47,000	19	11
Land west of Canal				32,835	7	10
Total for Land				1,705,644	13	6
And in new works...	2,760,502	18	1			
Add value of materials unexpended June 24th, 1854	30,177	19	6			
Less do. do. 1841	29,827	15	11			
	350	3	7			
	2,760,853	1	8			
Deduct amount received for works executed for Corporation and other parties, under authority of Dock Acts	84,088	3	11			
				2,676,764	17	9
Add incidental charges not deducted from income				85,984	9	2
						4,468,393 16 5

That is compiled from documents to the accuracy of which I can give my sanction as chairman of the Dock Estate; the only amount upon which there could be any question, would be the amount of the incidental charges. It might be open to contention as to the 30,000*l.*, whether the incidental charges ought to go to revenue or to capital; that is the only question as to any part of the account I can raise. The account shows that, beyond paying the interest of the bond debt and the expenses, and beyond the deductions which have been made, we have expended at least 723,000*l.* of income on the works since the year 1841, independently of what has been spent previously to that year, which, no doubt, was very large. The parties who advanced their money upon the credit of that security have got that expenditure added to their security since the year 1841. *C. Turner, 23 Mar., 1855.*

The surplus which we have received, and which we have applied to the extension of the works, is notwithstanding the reductions which took place first in the year 1836, which was 38½ per cent., upon goods and tonnage. If you take the goods and tonnage of the years 1835 and 1836—that is, from the 24th of June, 1835, to the 24th of June, 1836—the money amount of that reduction would have been 92,000*l.*; taking the goods and tonnage of the year ending the 24th of June, 1854, the amount of the 38½ per cent. would have been 198,275*l.* That is the first reduction which took place in 1836. In the year 1844 there was a reduction of 33 per cent. upon the tonnage to the East Indies, the west coast of South America, and New South Wales, which, according to the tonnage of 1846, was 3441*l.* Then, in the year 1848, there was a reduction of sundry amounts upon goods and other matters which I cannot very well enumerate, which at that time amounted to 40,000*l.*, and which, no doubt, would be more now, but we have not calculated it. I have gone through the three reductions. I have given you the reduction of 1836, first of all, upon the year it was reduced; then it was 92,000*l.* Then the reduction of 1844, taking the year 1844-5 as the basis of the calculation, that was 3441*l.* Then, in the year 1848, taking the reduction upon the trade of that year, it was 40,000*l.* That is, taking the three years, the deduction being calculated upon the trade of the year in which it was made, and supposing no deductions had been made, and the trade of the port had been the same as it was actually in the year 1854, the dock revenue, instead of being 385,000*l.*, would have been 628,823*l.* The reduction of charge has probably led to an increase of our tonnage. Our legal position, as regards those reductions, is permissive, but not compulsory. We have exercised that permissive power in the manner we thought best for the trade of the port. Amount of reductions

We are now asking from the Legislature power to borrow to the extent of four millions. The surplus revenue of 69,000*l.* at 5 per cent. would represent a capital of 1,383,000*l.* We calculate the working expenses of the 13½ acres of docks at Wapping at 580*l.*, and the pro- Power to raise four millions.

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bable revenue 1503*l.* per annum, that would be 923*l.* net, per acre, which will give us 12,460*l.*, which, capitalised at 5 per cent., would be 249,200*l.* From the warehouses nearly completed, at 7 per cent. upon their cost, 250,000*l.*, we expect a revenue of 17,500*l.*; that, capitalised at 5 per cent., would be 350,000*l.*; that calculation is based upon my experience. The income from 120 acres of new dock space, taking half the area of the float, at 923*l.* per acre net, is equal to 110,760*l.*, which, capitalised at the same interest, would represent 2,215,200*l.* The rent to be derived from the timber land at from 9d. to 1s. a yard, realising 30,212*l.*, when capitalised at the same interest would be 604,240*l.* We contemplate a return to be derived from warehouses to be built under the Act we are applying for. We do not want powers to build them, but to raise the money. Upon the same basis of calculation 66,500*l.* is the income; that represents a capital of 1,330,000*l.* The total is 6,128,640*l.*, which is what we propose as security for the four millions for which we ask.

Expected revenue.

The estimated probable revenue from the thirteen acres of dock is in conformity with experience, but inasmuch as the year 1854 might be considered an exceptional year, and we have had a reduction since then, we have allowed for that reduction in making that estimate; the 1503*l.* per acre is after making such an allowance. If the calculation had been formed on the experience exclusively of last year we should have put it at a higher figure, but we have made a reduction in consequence of trade being indifferent now, and it might be supposed that the year 1854 was an exceptional year. If we had ended with the year 1854 it would have been a higher figure. Of warehouses we have actual experience, and upon a scale adequate to forming a just opinion. We have also had experience of the income to be derived from the new dock space, and of the letting of land at per yard, but witnesses will come before the Committee who can give them more practical information upon the letting of land per yard than I can. The contemplated warehouse revenue is taken from our own experience and the experience of warehouse owners in the town, who have made 7 per cent. and more of their money, and our warehouses are much better located, being upon the margin of the dock, and not subject to the same charges of cartage.

Cross-examination.

Cross-examined by Mr. Serjeant Wrangham.

Our present borrowing power is 5,284,000*l.*: we have not borrowed it in point of fact, but that is our Parliamentary power of borrowing. That represents the amount of our debts as nearly as may be, if you take the return up to yesterday. I believe we have borrowed about 6000*l.* more than that, but that is accounted for in this way: we have borrowed of the Corporation; we have given notice to pay on the 1st of April, therefore we have 35,000*l.* or 40,000*l.* lying at our bankers, which we have borrowed for the purpose of assisting to pay off

the debt, and therefore the 6000*l.* we have over-borrowed we shall be under-borrowed on the 1st of April, having paid off to the Corporation 50,000*l.* Our borrowing powers may be said to be over-exercised, but deducting the 35,000*l.* in the bank they are not so. The bankers owe us 35,000*l.* *C. Turner,* 23 Mar., 1855.

What we owe the Corporation is represented by part of our bond debt; we have either issued bonds, or given them an obligation to issue them; they are a part of our bond creditors, either bonds actually given or bonds which we are bound to give them. It is in the bond debt; and therefore I say, when we have paid them the 50,000*l.*, we shall be able to re-borrow that 50,000*l.*

We have expended very large amounts of money in land purchased from the Corporation at different periods. A good deal of it was strand, which was converted by the Dock Trust into land. Purchases of land from the corporation.

We have, under our Parliamentary powers, the option of raising the rates; we have never raised them after once lowering them, that I am aware of, nor is it probable that we shall. Our borrowing powers are exercised on the security of the rates, and therefore it will be a question for the bond creditors whether, if the sources of income should not be quite sufficient to meet the 4,000,000*l.*, we should have to meet it by an increase of rate. I should think they could enforce the raising of the rate if the existing income was insufficient to pay the interest of their bonds. Power to raise the rates.

The surplus revenue of last year is represented by 69,000*l.*; that is part of the revenue upon which we declare, as the security upon which we are seeking these powers. The surplus on the 25th of June, 1853, was 8565*l.*, but the aggregate of the surpluses from 1841 to 1854 was 723,000*l.* over the thirteen years. The public seem to think that a surplus income of 69,000*l.* one year, and 8000*l.* the year before, and 16,000*l.* the year before, would be safe to deal with for an advance of 4,000,000*l.* Since we have given notice for the Act of Parliament we have had no difficulty in borrowing the money; the public seem to be perfectly satisfied. I do not know whether the members of the Dock Trust hold many of the bonds. I never looked over the list; there is no ground for supposing they do not. I do not think any member of the Dock Trust has the slightest doubt as to the validity of the security. I never examined who holds the bonds; it is not a question that I have ever thought it necessary to look into. Surplus revenue.

The last time we reduced our rates was in 1848; our surplus income then fell from 111,000*l.* in the previous year to 20,000*l.*, 26,000*l.*, 16,000*l.*, and 8000*l.*, down to last year. We are borrowing at present on our bonds at 4¼ per cent.; they bear interest at whatever rate people take them at. We are now issuing bonds at 4¾; the average rate is 4⅛; the present state of the money market is high, we borrow at par, and give a rate which will enable us to get money at par; that at present

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is 4¾ per cent., but I am justified in saying that we borrow money at as cheap a rate as any company in the United Kingdom; generally speaking, we do not find our rate is higher than the rate of interest of any first-rate railway company, or any other company. The Victoria Docks in London are giving something like 5 per cent.; I know they were doing so not long ago. I think the credit of the Dock Trustees stands very high in the money market.

I was not a member of the Dock Committee in 1844 or in 1848. I cannot tell you what exactly the works of 1848 comprised; I know we are not now proposing to alter the Act of 1848 as regards the sea-wall, nor the works connected with it. The surveyor will tell you all that. (*b*)

Sea-wall under the Act of 1848.

As regards the sea-wall, which is the only part which is constructed, excepting that dock, that is strictly in conformity with the plans deposited, and those plans had received the approval of the Admiralty at the time the Act passed, as I understand the question; therefore, as regards the sea-wall, the approval of the Admiralty has been obtained. I am not aware that the approval of the Admiralty has been obtained since the Act passed. The sea-wall is the wall delineated in that Act, as I understand, and, therefore, so far I apprehend the approval of the Admiralty has been obtained. I believe that sea-wall to be identically the same as that which was deposited in Parliament. I do not know exactly as to the entrances. I believe the line of the wall to be the same. The surveyor will be here. In conducting the business of our trust, the correspondence with the Board of Admiralty would most likely be conducted through the solicitor.

Money under Act of 1848.

Under that Act of 1848 power was taken to borrow 500,000*l*. I cannot tell you how much was dedicated to the works to be constructed, including the sea-wall, upon the lands acquired under that Act, and how much for other and for what purposes. I have understood from the surveyor that he has spent about 100,000*l*. upon the sea-wall; you can get that from the surveyor. I cannot tell you the amount of property in land, that is, the area of land available for dock purposes which the trustees are already in possession of; the surveyor can give it to you; he has the whole of the details.

Veto of the Town Council.

Any report of the Dock Committee is subject to a veto by the Town Council; if they do not veto, it is confirmed. They must veto it by two-thirds, and it must be done by the first monthly meeting of the Town Council which takes place after the proceedings have passed. A resolution was moved by myself, as Chairman of the Dock Committee, to

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(*b*) The witness was here referred to the 24th section of the Act of 1848, which was as follows: "That previously to the commencement of the said sea-wall and docks the trustees shall deposit at the Admiralty Office, Whitehall, plans and working-drawings of such sea-wall and docks, and no part of such sea-wall and docks, or any works connected therewith, shall be commenced till the same shall have been approved by the Lord High Admiral of the United Kingdom or Commissioners; and all such works shall at all times from time to time thereafter be subject to be constructed in accordance with such modifications as the Lord High Admiral or the Commissioners shall direct."

the effect, "That so far as respects any proceedings, resolutions, and reports relating to the extended dock accommodation, or the improvement of the Dock Estate, this Council, as Trustees of the Liverpool Docks, approves and confirms only the principle that dock extension is now required; and sanctions the proposed purchases of land, and an application to Parliament in the course of the next session for that purpose, and for raising the necessary funds, reserving for further consideration all questions of detail however arising thereunder." In moving that I have no doubt I said, "With reference to the proposed plans, the Council, by confirming the Dock Trustees' proceedings, only bind themselves to sanction the purchases from Lord Derby and Mr. Lee, and to sanction the Dock Committee going to Parliament for power to make those purchases and to schedule other land, and also to sanction the raising three and a half millions; the application of which money, with the exception of completing the purchases of land from Lord Derby and Mr. Lee, amounting to 250,000*l.*, must come in detail before the Dock Committee and the Council, to be subject to their approval or rejection;" in substance at all events. I have no doubt I went on to say, "These powers, if obtained from Parliament, must be exercised under the control of the Council; but in going to Parliament it is desirable to go for an extended plan, to look ahead, and to anticipate the wants of this great port, and to provide for them as they arise from time to time. It is not necessary that the money should be spent in two years or three years, but as the wants of the commerce of the port dictate, subject in the first instance to the approval of the Dock Committee, and then to the control of the Council. The same observation applies to the million proposed to be devoted to warehouses. It is not proposed to build those warehouses immediately. One stack at the Stanley Dock is in progress, another stack at the Wapping Dock will be built next year. These and other warehouses will only be built as the merchants of the port call for them, and the necessities of the port require them." The Council approved of the whole plan, but the other parts of the plan would necessarily come before them in detail, and they could veto the other parts of the plan hereafter if they pleased. They could veto the purchasing of part of the land, and they could veto the erection of part of the warehouses. They could veto the plans for the docks. The order of proceeding is this: After the Act had been obtained these matters would come before the Dock Committee, and be passed in a certain shape. These details would be passed by the General Committee. They would at the first meeting of the Council come before them, and they might veto those details. It would be the same as is the case wherever parties take land for railway purposes, or any other purposes where the powers are permissive. Those powers may or may not be exercised. No doubt it is the *bonâ fide* intention of the parties to exercise them, but there is a power to leave those powers in abeyance. A railway must be made according to the plan and section deposited in

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Veto of parts of a plan.

Discretion as to exercise of powers.

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Parliament within variations. We should be at liberty, supposing this Act to pass, to make such works as the Dock Committee and the Council, at the instance of the sub-committee, shall think fitting, within the powers of our Act of Parliament. The plans I apprehend might be varied, supposing it was thought necessary to construct the dock of a different shape—for instance, to throw those two docks into one. The whole money must be expended for dock purposes; but if, on further consideration, it was thought desirable to make the docks of a different shape, we should have the power to vary them to that extent. That has been the manner in which former Dock Acts have always been obtained. Certain plans have been deposited, and the Dock Committee has had the power to vary those plans; and very greatly to the benefit of the trade it has been found to be, because, as we only exist for the benefit of the public, we have been able to vary them so as to give more accommodation to the public than we should have been able to do if we had been bound to a specific plan. It is very different where there is a proprietary, who have interests of their own to consult. Money authorised to be raised by Parliament upon certain plans submitted and discussed before Committees of both Houses of Parliament has been employed upon other parts of the estate for different purposes, but very greatly for the benefit of the public. There has been no loose wording in the Acts. The power is especially given under the Act of Parliament for that purpose, to be applied to it or other purposes.

Power of varying plans.

Parliament has always understood that the intention was a *bonâ fide* one to construct the works upon those plans, but looking at the constitution of the Dock Committee, it has always given power to vary those plans, and apply the money to other works if it was for the benefit of the public.

Accommodation of the timber trade.

We went for our Act in 1848, to accommodate the timber trade at the north end of the town; nothing has been done since 1848 to accommodate that trade, and it was very well that we were not obliged to do so. The timber trade were not then willing to remove. We took powers to construct them a dock upon the Harrington land; they wished to remain at the south end; that might have been in 1844. The principal ground upon which the Act of 1848 was recommended to the Committees which sat upon it was the accommodation of the timber trade at the north end of the town, which is now the ground upon which we are seeking these further powers; nothing has been done in the interim for that purpose, the timber trade themselves objecting to it. It was not our wish not to do it, but the timber trade did not wish it. I do not know what they said in 1848. When it was attempted to be carried out they did not wish it to be done.

Construction of works as proposed.

By the Committee.—If this Bill passes I believe the money raised under it will be employed in carrying out substantially the plans which have been submitted to the Committee; that is the intention, undoubtedly. I do not know that we have any other purpose for which to raise

the money, and if the money is raised it will be expended for the purpose of carrying out those plans. This plan has been submitted to the Committee after mature consideration, and it is not merely a plausible way of obtaining money to be employed for the general benefit of the Dock Trust; and unless an American war, or some great calamity comes over the trade, or something happens to make it unadvisable to extend the docks to the extent to which we contemplate, it will be desirable we shall expend the money substantially upon the basis of the plans submitted to the Committee. Money has been raised under the Act of 1848, and spent upon the docks. I am not sufficiently familiar with that Act to say, but I apprehend the object was to construct some docks upon that land, which certainly have not been constructed; but there was a special clause empowering the Dock Committee to expend the money upon other parts of the estate if it was more for the benefit of the trade. The timber trade not being willing to remove there, and docks being required in other parts, for instance, the Wapping Dock, it was spent upon that. I cannot say why we submit any plan to the Committee, or why we do not ask for the general powers of spending a certain sum for the benefit of the Dock Estate, relying upon our public position that Parliament will trust us with the discretionary power of spending that money in the best manner.

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There has not been any allegation made that the money has not been expended for the general benefit of the docks. No trade has complained that they have not had accommodation; on the contrary, all the trades at Liverpool are of opinion that the Dock Committee have done the best they can for the benefit of the trade. There is no merchant or trader connected with Liverpool who would complain that we had not spent the money in the way that is most for the advantage of the trade. If we had carried out what has been spoken of in reference to that land, we should have been doing an injury to that trade. No question has ever been raised as to the legality of this mode of spending the money. The Committee must bear in mind that we are a public body without any proprietary or beneficial interest, and therefore we have been trusted with powers which would not be given by Parliament to a proprietary company.

No charge of improper expenditure of money.

Cross-examination continued by Mr. Serjeant Wrangham.

Cross-examination.

We have the power of determining how the money shall be spent; we have the power of raising the money, and then we spend it as we think best for the benefit of the Dock Estate, except in a case where, as in 1848, we are obliged to deposit certain plans at the Admiralty, by which we are to abide. All we have done as regards the river front has the full approbation of the conservators of the river. Of the 500,000*l.* raised under the Act of 1848, 100,000*l.* has been spent upon the river wall. I cannot tell the Committee how and where the remaining 400,000*l.* has been spent. A great deal of it has been spent since I

Power of determining as to the expenditure of the money.

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came into office; at least we have spent a good deal of money since then. A great deal of it has been spent, I dare say, upon the Wapping Dock; we have spent a very large sum of money within the last few years. I do not say that a great part of the 500,000*l.*, raised under the Act of 1848, has been spent upon the Wapping Dock; what I say is this, that an amount of 300,000*l.* or 400,000*l.* had been spent upon that dock. We have had great powers of borrowing, and we have borrowed more money than that within the last four or five years. The surveyor can tell you for the last four or five years the exact works upon which all the money has been spent; you can calculate for yourself where the money comes from. We will begin with 1848, and will give you the exact items of each work upon which money has been spent. We are now coming for power to raise 4,000,000*l.* of money. Of that there is already appropriated 90,000*l.* to Lord Derby, and 164,000*l.* to Mr. John Shaw Lee.

Unappropriated land.

I cannot tell you whether there is about 100 acres of land the property of the Dock Trust available for dock purposes but not appropriated. The Harrington Estate is a large proportion, and that is entirely occupied by the timber trade. I cannot tell whether in that year 1844, when the Act passed, we obtained power to raise a million and a half of money or thereabouts for the purpose of completing the purchase and constructing docks upon the Harrington Estate. I have the amounts borrowed under each of the Acts, but not the date of the year. We have borrowed under the Dock Act of George the 4th, 69,735*l.*; 4th Victoria, 884,000*l.*; 7th and 8th Victoria, 1,500,000*l.*; 9th and 10th Victoria, 1,000,000*l.*; the 11th Victoria, 500,000*l.* The whole of the money I have mentioned has been expended, and the reason why there is no dock upon the Harrington Estate is, that the timber trade rose up against that land being used, and the consequence is that we have lost 11,200*l.* a year ever since; we are obliged to accommodate the timber trade. A dock for the purposes of timber, which the Brunswick Dock has been, without land for the storage of timber, could not be used. Till the timber trade removes from that part of the town it will be impossible to make any dock upon the Harrington Estate.

Opinion of timber trade in 1848.

In 1848 the timber trade were very anxious to remain at the south end of the town. That was the case which we went into lately. They are now so much cramped for room at the south end that they are anxious to get to a place where they can have more facilities for room and for land and water carriage, and by our plans at the north end of the town we believe we shall give them more facilities of storing their timber, a more certain tenure, and facilities of transit; that we shall give them those advantages which will make Liverpool one of the best ports in England for the accommodation of the timber trade, which it certainly is not now. And there are persons connected with the timber trade who will speak as to the advantages and disadvantages of the removal, and will speak as to those matters from professional information. I am in error as to

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the timber trade being opposed to the north docks in 1848; they were then supporting the Dock Trust in their application to Parliament for the timber float, which was contemplated as part of that Act; but I have understood that subsequently to 1848 they did not wish to remove. I was not a member of the Dock Committee then. The practice of storing timber in ponds is preferred upon the east coast. In Liverpool there is a prejudice against it. Everything connected with timber should be done at a cheap rate; that is one of the reasons we wish them to go to the north end of the town. I cannot tell whether in 1848 it was represented by the Chairman of the Committee as a recommendation to the north end of Liverpool being employed for timber that they could let land to the timber trade at the rate of 3d. or 3½d. a yard; very much cheaper, therefore, than they could at the southern end of the town. I only became a member of the Dock Committee in 1850, and am not aware of the representations which were made in 1848. We now put it at from 9d. to 1s. a yard. (*c*)

Advantages of north docks.

The Huskisson Dock has been made since 1848. The whole of one side is occupied by the Cunard line, and half the other side by Collins's line of steamers, the largest steamers which are afloat, the widest over the paddle-boxes; they can only just get in at the gates. We have been obliged to erect stanchions to prevent the paddle-boxes getting over the side of the quay. It sometimes happens that they cannot get in at all. I cannot say it never happens that vessels, endeavouring to enter these northern docks in north-westerly winds, are damaged; that is a matter the surveyor will speak to. They are not more damaged there than at any other part of the town. In fact, vessels are more easily docked there than in other parts of the town. I have no recollection of having received complaints from masters of vessels as to the danger or damage resulting to them from the exposed position of the dock entrances at the north. On the contrary, some of the largest shipowners in the port, Mr. Ranken, and some others, prefer going into the north docks to any other docks in the port, and I believe the expense of docking a steam-boat in the northern docks is half the expense of docking at the others.

Cross-examination.

Cross-examined by Mr. Goldsmid.

I gave 1844 as the date of one of the reductions of tonnages in Liverpool. It was upon ships; it was 33 per cent. on tonnage to the East Indies, the west coast of South America, and New South Wales; the rate was reduced from 2s. 3d. a ton to 1s. 6d. I gave 1848 as the date of another reduction. Those reductions were so multifarious that I could not give them to you; they were upon goods. I cannot tell you whether 1844 was the date of the passing of the first Birkenhead Act, or whether 1848 was about the date of the opening of the Morpeth

(*c*) See Evidence in House of Commons on the Liverpool Docks Bill, 5 May, 1848, Webster's Report, pp. 4, 10.

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Dock at Birkenhead. The reduction of the rates is entirely discretionary with the trustees. The statement by Mr. Bramley Moore, (*d*) that we are bound to reduce the rates, or that they were bound to reduce the rates when there was a surplus for two months, meant, I apprehend, that, inasmuch as the rates can only be applied to dock purposes if the rates are more than sufficient and the accommodation sufficient, we are bound to reduce the rates to get rid of the surplus. We cannot divide the money.

Vessels discharging or filling up in the stream of the Mersey liable to Liverpool rates.

Steamers sometimes take in part of their cargo in the Mersey. The Liverpool Trustees have levied rates upon a vessel under those circumstances. If steamers take in any part of their cargo in the river they would become subject to the rates at Liverpool, besides those at Birkenhead, although they did not enter the Liverpool Docks at all. Large steamers sometimes lighten their cargo before they go into the Liverpool Docks; it depends upon the depth of water. Sometimes, in going out, they take in part of their cargo in the river. If vessels were not required to pay rates when they discharge in the river, the estuary of the river would be very much obstructed; that is, if they did not use any dock at all. That would not apply to their using the Birkenhead Docks rather than Liverpool. If a vessel takes in a single parcel in the river, the vessel becomes subject to the whole of the Liverpool rates; the cargo does not. The rate on cargo is only upon that which is taken in or discharged in the river; the whole of the vessel becomes chargeable.

The existing water space is 191 acres; that amount will be about doubled under this Bill. I have not calculated within what number of years the tonnage of ships coming into Liverpool has doubled. The probability of our wanting these 140 acres of dock accommodation was an element of consideration with the Committee when they came to the determination to recommend this scheme. The estimate of the Dock Committee was, that the docks would be required before they could be finished; that was based upon the past increase of the trade and the opinion of the Committee, who consisted of mercantile men, as to the prospective increase. You cannot make a rule of three sum of these matters; it is a good deal a matter of opinion. I should think it would be ten years before the whole would be completed. In making an estimate of the accommodation which would be probably required for the Mersey, we have not considered Birkenhead in the matter at all.

Amalgamation of Birkenhead with Liverpool.

Our belief is, and my strong belief is, that unless Birkenhead passes into the hands of the Dock Committee or the Corporation of Liverpool, ships will not go to Birkenhead. I believe Birkenhead can never be made a port, and that the trade will never go over there, except it is in the hands of the Liverpool Dock Committee.

(*d*) See Evidence in the House of Commons on Liverpool Docks Bill, 5 April, 1848, Webster's Report, p. 13.

Examined by the Committee.—I think that, because the advantages of being able to go into the Liverpool Docks and use them are so great, the trade itself being located at Liverpool. A man might go into the Liverpool Docks, and afterwards he might go, for particular trades, to the other side for partial purposes, but he will never forego the advantage of the Liverpool Docks to go into Birkenhead. Supposing the Liverpool and Birkenhead Docks were amalgamated, and under the Liverpool Dock management, I think that Birkenhead would be used for dock purposes. It would be used in this way: vessels would come into the Liverpool Docks, some trades would afterwards go into the Birkenhead Docks as they found conveniences to suit them, and there would be a sufficient quantity of those trades to occupy the Birkenhead Docks; but a vessel will never charter on the other side to go into the Birkenhead Docks without an opportunity of coming to Liverpool. I think the vessels using Birkenhead would be vessels also using Liverpool; in that way I have no doubt a trade would spring up between the two places. Vessels would never be found to go into the Birkenhead Docks. There was a fact told me—I can only speak of these matters from what I am told—by one or two gentlemen in the timber trade, particularly the mahogany trade. I am informed that mahogany will not fetch within 10 *per cent.* so much if lying on the other side as if it was lying on the Liverpool side. You cannot make two markets for these things. We tried two hay markets in Liverpool; one of them was obliged to be given up. People will have one market, and only one. I think if Birkenhead was in the hands of the Liverpool Dock Trustees some ships might go over there for particular trades, and the thing might be worked as a whole. If there were two dock rates, but separate management, Birkenhead and Liverpool would not be used for the convenience of the trade. The harbour dues are nothing; they are paid on both sides; what you call harbour dues and light dues are dues merely for the purpose of buoying and lighting, which are revised every three years, and specially limited to the amount required for buoying and lighting the port. You could not take away the harbour dues. The only charges to which Birkenhead vessels are liable, which they complain of, are charges upon vessels partly discharging in the river; the relief from that amounts to very little. If you crimp and confine the Liverpool Docks till they will not hold the shipping, you may drive the shipping to the other side, but you can only do that; and if you give proper accommodation on the Liverpool side, such as the merchants prefer to going over to the other side, they will not go over to the other side. These objections to the use of the Birkenhead Docks would not apply when they were under the same management as the Liverpool Docks exactly in the same way. I should contemplate, if they were under the management of the Liverpool Trustees, that a certain number of vessels would come into the Liverpool Docks and afterwards go over to Birkenhead; or they might go to Birkenhead and

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Birkenhead as an adjunct to Liverpool Docks.

Only one market.

Interchange of vessels.

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then come to Liverpool. We could make something of it, but the Birkenhead proprietors cannot.

Recommendation of Board of Trade.

The following passage in the Report of the Board of Trade—"It appears to be a matter for consideration whether the opportunity now offered by the trustees coming to Parliament for fresh powers should not be taken advantage of, for the purpose of considering the recommendation of the Royal Commissioners that the dues to be levied on vessels and goods carried in vessels should be confined to vessels and goods receiving benefit from the application of the dues. At any rate, it appears desirable that the future settlement of this question should not be embarrassed by subjecting the tonnage dues in question to a large additional charge"—refers to the question of vessels partly discharging in the river. I think there would be injurious effects on the trade of Liverpool if this principle were carried out; it would be unjust. If you confine it to the vessels going to the Birkenhead Docks, it is one question; if you carried it to the extent of all vessels discharging in the river being freed from the rates, that would be a still wider question. In either case it would be a matter of injustice to the Liverpool Dock Trustees, and would occasion a certain amount of inconvenience to the trade generally. The question would arise as to the injustice to the Liverpool Dock Trustees in the first place, and the trade generally in the second place. I have stated that the Liverpool Dock Trust only exists for the general benefit of commerce, and that they have no separate or individual interest in the matter. It would be a great disadvantage to the whole trade of Liverpool if vessels were allowed to be freed from rates when partially discharging in the river. Vessels partially discharging in the river would come into the river and partially discharge if the weather happened to be fine; if it was bad weather they would go into the docks. In any case they would have the docks upon one side or the other under their lee to make use of or not, as they thought proper. Then, in the next place, all the goods discharged from those vessels must be landed upon the Birkenhead Dock quays, or the Liverpool Dock quays, and it would be a great question whether vessels going into the dock should pay for the accommodation of vessels not going into the docks, and having part of those advantages. My objections rest both upon the overcrowded state of the river and upon the injury done to the pecuniary interest of the Dock Estate. If vessels discharging in the river were free from rates, it would be a question of conservancy and police upon one point; and it would be an injustice either to Birkenhead or the Liverpool Dock Estate, provided those vessels could bring their goods, and put them upon the quays that have been built at great expense, without paying anything. I attach much importance to the first objection. I think the inconveniences would be very great; vessels might lie off the entrances of the docks and occasion very great difficulty in docking and undocking vessels, and impede the navigation of the river very much

Objections to discharging in the river.

indeed. As to the second point, the pecuniary effect upon the Dock Estate, I am not prepared to say whether it would be so considerable that it would oblige us to raise the rates. I do not think it would be justifiable to charge a vessel using the docks for the accommodation of a vessel which did not use them: and we must of course levy rates upon the vessels using the docks to give accommodation to those which were not using the docks at all. As to the propriety of relieving vessels which use the docks on the Birkenhead side from any payment for any part of the cargo discharged in the stream, the objection which strikes me at first is this—The Liverpool Dock Trustees, in the origin, received rates upon all goods and ships loading or discharging within the river Mersey. When the matter as to the Herculaneum Dock was settled, and the Birkenhead matter was settled, it became necessary to draw the line somewhere. This arrangement, after a good deal of discussion, was made: that no vessel not using the Liverpool Docks should pay, except those discharging in the river. I do not see any good reason for altering the arrangement which was then come to. Prior to that arrangement, if a vessel entered the Mersey and discharged or loaded her cargo anywhere, she paid rates to the Liverpool Docks; the matter was then altered to this extent: that vessels using the Birkenhead Docks should not pay the Liverpool rates, unless they loaded or discharged part of their cargo in the river; then that the vessel should become subject to rates, but only such part of the cargo as was loaded or discharged should pay. (*e*) If the alteration was made only as to the Birkenhead Docks, I do not imagine that the pecuniary effect upon the Liverpool Dock Estate would be considerable; it would still leave a surplus income to the Liverpool Docks. If we have a surplus income we reduce our rates. Whatever was taken from us would diminish our security, and prevent our making our rates so low as they might be made; the greater our sources of revenue the lower we can make our rates. If the two interests were worked as one, under the Liverpool Trustees, I think we should give up all the land marked yellow; we should not carry out those works; but I think the other land would be necessary, the purple, the blue, and the pink. The other land I have no doubt, under such circumstances, the Dock Committee would give up entirely. We should require the purple for the purposes of dock accommodation. All we have a discretionary power over there we should give up, the block of land we have conditionally purchased of Lord Derby and Mr. Lee we should not. The yellow land is very much for the purpose of making yards and different things for engineers and persons requiring water accommodation connected with steam-ship building, and matters of that kind. It has no particular reference to railway accommodation, except this, that it is near the railways. It has rather reference to the canal.

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Exemption of vessels not using the Liverpool Docks.

Effect on dock estate small.

(*e*) See Introduction to Port and Docks of Birkenhead (*Ed.* 1848), pp. xxiii., xxiv., for history of this change; also Index, *Tits.* "Exemptions from Rates," "Harrington and Herculaneum Docks."

C. Turner, 23 Mar., 1855. Negotiations for purchase of Birkenhead.

The negotiation which has taken place with respect to Birkenhead is between the Corporation and the Birkenhead proprietors. There is no question the Corporation expect, and probably it would be the case, that it would come into the hands of the Liverpool Dock Committee. I have not considered how much water space we should thereby acquire.

Mr. Heron, the Town Clerk of Manchester, claimed to cross-examine the witness on behalf of the Corporation of Manchester.

Mr. Merewether objected that the Corporation of Manchester had no right to appear in opposition to the Bill.

Mr. Heron was heard in support of the *locus standi* of the Corporation.

The Committee decided that the Corporation of Manchester had not a *locus standi* to be heard on the preamble of the Bill.

Monday, 26th March, 1855.

THE RIGHT HONOURABLE HENRY LABOUCHERE IN THE CHAIR.

Mr. Gregory proposed to cross-examine the witness on behalf of certain owners of land at Wallasey.

Mr. Merewether objected to the appearance of the petitioners.

Mr. Gregory was heard in support of the *locus standi* of the petitioners.

The objection was waived.

Cross-examination.

Charles Turner, cross-examined by Mr. Gregory.

The river wall, as constructed, is within our parliamentary powers. The Admiralty approved of it, and therefore there must have been a plan, I apprehend, deposited; and the Conservator of the river has approved of it. The wall was constructed, the greater part of it, before I was Chairman. I have always understood that to be the case, and I have no doubt either that the Admiralty gave its approval, or that it is strictly within the parliamentary powers. We do not interfere with the estuary of the river in any shape or way. As Chairman of the Committee these things come before me from time to time. I was not Chairman at that time.

Cross-examined by Mr. Calvert.

The amount spent upon the north stack of the Stanley warehouses, which is the only one now finished, was about 80,000*l.* The stack on the south side of the Wapping warehouses is estimated to cost about the same. The whole of the three, I think you may take it, will be about

240,000*l.* to 250,000*l.*; whatever progress the works have made is included in the 5,240,000*l.* *C. Turner*, 26 Mar., 1855.

[*By the Committee.*—I do not know where the merchants reside; they reside all over England. The business is entirely done by merchants having offices in Liverpool. The trade of Liverpeol is conducted very much by agency; the parties who have agents at Liverpool are parties living all over England—no doubt in Manchester and Lancashire. The manufacturing population of Lancashire and the West Riding do an immense quantity of business through Liverpool; people in London also do a great deal. Everybody is aware that Liverpool derives a great deal of its consequence from its proximity to the manufacturing districts. Every one trading to Liverpool, who has occasion to pay charges of any kind, has an interest in the judicious outlay of the money.] Agency business at Liverpool.

We have purchased the pink and the purple, subject to the approbation of Parliament; we propose, besides getting the confirmation of Parliament which this Bill is to do for the pink and purple, to have the power of purchasing the whole of the land marked yellow. I think it would be most unwise to make docks upon the blue land without getting possession of the pink land, inasmuch as these docks are intended principally, if not entirely, for the timber trade, and those who are conversant with the timber trade state to us clearly their opinion, that there is not sufficient depth of land upon the blue to make them available for our purposes without possession of the pink land. Also, I am of opinion, that if we make docks at all upon the blue land, and of course we cannot allow it to lie idle, the pink land will be worth twice the money after those docks are made. We have now conditionally purchased it from Lord Derby. My impression would be, that it would be very unadvisable to make docks at all unless we had the pink land. The effect of passing the Bill would be to confirm the purchase of the pink and the purple land from Lord Derby for 90,000*l.*, and Mr. Lee for 164,000*l.* The estimated cost of the yellow land is about 624,000*l.*; a great deal of that yellow land—the part of it, for instance, which backs upon the Derby Road—is intended to be turned to this use—there is a canal, and there are docks underneath there—a portion of the land between the Derby Road and that canal will, we contemplate, be occupied by boiler yards and foundries, and other trades which are very essential to carrying on the steam-shipping trade, which it is almost imperative should have access to the water for the repair of the steamboats at a small expense.—We estimate that land to let for 9d. to 1s. a yard, and produce a revenue immediately. We take power to borrow four millions; the warehouses are 970,000*l.* of it, which we estimate will pay us 7 per cent. We do not tie ourselves to any specific plan in asking for that amount. We shall spend the money as the trade of the port may require. The agents of the Manchester gentlemen are very active in looking after the interests of their clients; and, in fact, all parties in Liverpool who pay the rates are very active in looking after

C. Turner, 26 Mar., 1855.

the Dock Committee. The Chamber of Commerce have passed no resolution against the proposal; some individuals have expressed opinions against it. The only opinion which the Chamber of Commerce have expressed upon the subject is, that it would be in their opinion desirable to get other engineering evidence; they laid that opinion before us, for our consideration. I do not think they went to the extent of recommending us to suspend proceeding with these works till that evidence was obtained. I must say I think there was a good deal of Birkenhead feeling about that; several gentlemen connected with Birkenhead put those questions to us. There are members of the Chamber of Commerce merchants in Liverpool; but I am prepared to say that a very strong preponderance of opinion in Liverpool is in favour of this scheme. I was present at a meeting of the Dock Trustees when Mr. Evans made a proposition to restrict the scheme within the existing amount of land held by the Trust. I do not recollect that he stated that the extent of land already available for dock purposes was 370 acres. There are larger merchants connected with the Dock Committee than any of the gentlemen who appeared before us from the Chamber of Commerce. I do not think that Mr. Bold requested that the scheme should be suspended. There was a considerable meeting of Dock Trustees, and the only gentlemen who voted for the suspension of the scheme, Mr. Bold being present, were Mr. Evans, the mover, and Mr. Barber, the seconder, of the motion; they stood by themselves. Mr. Bold said: "It was well known there was a negotiation going on between the Corporation of Liverpool and the Birkenhead proprietors. If the Birkenhead Docks were purchased by the Corporation of Liverpool, and eventually transferred to this estate, then he thought that a great many gentlemen who now might be inclined to vote for proceeding further north would not be disposed to do so. If Mr. Evans would delay his motion to the next meeting, something would be known before next Thursday, and then the Committee would be in a very different position for coming to a vote from what they were now." Mr. Bold's proposition for suspending our decision upon the matter was, because, he said, if the negotiation were progressing, or should come to anything, we might alter our proceeding. The Committee thought there was no ground whatever for such a view of the subject, and Mr. Bold must have taken that view because, though he made this suggestion, the only parties to vote for suspending our proceeding were the mover and seconder of the motion. Mr. Bold voted the other way. It was not the opinion either of Mr. Robertson Gladstone or of Mr. Bold that if the negotiation terminated in the purchase of the Birkenhead Docks there was no necessity for the existing scheme. They thought that if the amalgamation took place some alteration in the scheme might be necessary; and I have no hesitation in saying, that if any amalgamation were made with Birkenhead, the yellow land probably might be done without. The pink and the purple would be necessary

Objections of Chamber of Commerce.

Of members of Dock Committee.

in any event, but some modification of the scheme would take place if an arrangement was made with Birkenhead. *C. Turner*, 26 Mar., 1855.

The Bill was brought before the Council, and a discussion arose upon some clauses of the Bill. Mr. Hornby objected to approving of the Bill, except upon the distinct understanding that it would again be brought before the Council before any proceedings were taken. He thought it was a very large scheme. He is very jealous of the privileges of the Council, and he did not like putting anything entirely out of some control on the part of the town, therefore he objected to the Dock Committee having power to spend four millions without any supervision of the Town Council. Objections of Council.

The only portion of the scheme which is compulsory is the 264,000*l.* Upon that understanding the Council gave their consent to the scheme. There is not the slightest fear of their exercising any power in the matter. There is no question whatever but that the Trustees and the Council will act harmoniously together. We shall ourselves propose, in case that arrangement takes place, that the yellow land shall be withdrawn. Those negotiations are now pending.

I do not know the extent of existing accommodation at Birkenhead. There is no dock accommodation at Birkenhead at all scarcely. There is only the Morpeth Dock. We cannot call the great float a dock accommodation. A vessel cannot load or discharge there, at any rate, without great expense. If the Birkenhead Docks remain as they are in the hands of separate trustees, you never can get ships to use them to any extent, they will be a dead letter and a ruin to all concerned in them. I said it was desirable that the negotiations as to the Birkenhead Docks should go on, and I think it is desirable that they should be in the hands of the Dock Committee; that may take place which never will in the hands of separate trusts; and it is very desirable that we should not have these constant contests before Parliament. They are wiser at Manchester, and conduct their affairs more peaceably. We have constant squabbles going on in Liverpool between rival interests, which cause the expenditure of a vast deal of money, and are very injurious to the trade of the port, and it is very desirable to put an end to them. Merely for the sake of the Birkenhead Docks I should hesitate considerably, though I think they may be worked with advantage by the Liverpool Dock Committee; but when I look at the squabbling which is going on, which will be put an end to, the thing becomes in my mind very desirable. But if you ask me as to the intrinsic value of the Birkenhead Docks without reference to anything else, I should hesitate. I cannot say whether the Birkenhead Docks afford equal accommodation for the transit of goods into the interior as those on the Liverpool side. Every one prefers Liverpool. Those who have been at Birkenhead once do not go twice. I think we could work the property in connexion with the rest of the estate profitably to both sides; but it must be worked in connexion with the Liverpool Dock Estate. Union with Birkenhead.

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Re-examined by Mr. Merewether.

The communication at Birkenkhead is by the Cheshire Junction Railway, of which Mr. Alderman Bancroft, of Manchester, is chairman; that is the only communication by rail, and there is no communication from Birkenhead by canal. There can be no doubt, notwithstanding the opinions of individual gentlemen, that a very great preponderance of feeling in Liverpool is in favour of this scheme. In the Dock Committee there was a division, two on one side, and all the rest of the Committee, who were present, upon the other; I think fourteen or fifteen. The Bill was presented to the Town Council as a matter to be passed by them in the shape in which it is now before this Committee. Mr. Hornby did not pursue his suggestion any further; it was rather a hint that the Council should not lose their power, and the Bill was passed in its present shape without any division.

Feeling in favour of scheme.

Persons all over England have an interest in the trade of Liverpool. Those interests are represented in Liverpool by the agencies of those parties very actively and carefully represented. The agents of those parties are ratepayers of Liverpool; they pay dock rates as representing their principals and local rates; they are very anxious that those dock rates should be reduced to the lowest possible amount. We have constant representations from the agents in Liverpool. If there is any arrangement about the docks that gentlemen at Birmingham or Manchester think prejudicial, we have a representation from their agents in Liverpool.

We have made that calculation of surplus from the general revenue of twelve or thirteen years, and it is based upon the receipts of those years; and that calculation is based a good deal upon the tonnage, because, as the Committee will recollect, we made a very large reduction in the year 1836, and another in the year 1844, and another about 1848; the tonnage, perhaps, shows more than anything else the growth of the port, and upon looking at the tonnage I find that upon the average of fifteen years, since 1816, the tonnage has doubled itself twice. The tonnage from 1816 to 1820 was 770,942 tons a year; the average of the years from 1826 to 1830 was 1,312,932 tons, that is, not quite double, but very nearly. From 1831 to 1835 rather more than double. If you take from 1826 to 1830, and so on from 1846 to 1850, one is 1,312,000, and the other 3,381,000 tons. I am now giving the tonnage which represents the trade accurately; the receipts are affected by deductions; the tonnage will speak for itself.

Estimate of surplus.

Under the Act of 1848 we raised certain money which was not applied to the specific object it was raised for; that change of application arose entirely from the representation of the trade. Our intention was to have constructed these timber docks, but the trade subsequently to the passing of that Bill made a strong representation against their being then removed; we could not force the trade, and there was a

Object of Act of 1848.

pressing need of those other matters being completed. It was completely out of regard to the trade. Parliament granted the powers for the purpose of enabling us to meet the pressure of the trade, and contingencies which may arise, and it has been of the greatest use. If we had been bound to adhere to the plan sanctioned by Parliament we could not have made the Huskisson Dock, and should have lost a large portion of the steam trade which we have succeeded in securing. It was for the general benefit of the trade of Liverpool that we were enabled to make that change. There has been no complaint of the diversion of that money from the intended purpose to the Huskisson Dock. I think it very desirable that the same discretionary power should be given to the Dock Committee that Parliament has previously entrusted to them. The proposed scheme is in contemplation of the trade of Liverpool going on as it is; supposing a reverse to happen—as the stoppage of our largest source of income and tonnage by an American war—we should not go on and execute those works; we should suspend them according to circumstances; we should only raise the money as we completed the works, and we should only complete the works as the trade required them.

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Discretion as to works.

We sent down to Liverpool to the Dock Office for a return of the vessels lightening and filling up in the river on their way to or from the Birkenhead Docks, on which Liverpool dues have been received. There appears to have been one vessel in 1851, and three in 1854, and none since; the total amount of the dues paid was 248*l.* There are the buoyage and light dues, which would be paid in any case; the extra amount paid is 215*l.*

Dues on vessels filling up in the river.

The necessity for one market is a difficulty in the way of Birkenhead becoming another Liverpool; that is the result of almost universal experience. It has been tried in several places, and universally found that you cannot establish two markets within any reasonable proximity to each other.

There is the Morpeth Dock at Birkenhead. There is nothing in the dues which should at all affect vessels going to Birkenhead if they chose; there is nothing in operation on the Liverpool side of the river which should prevent an owner taking his vessel into Birkenhead. In my experience I have found it to be universal you never could have two markets; a man coming down to Liverpool goes either to the north or the south end, and looks over the timber there; he will not cross to Birkenhead. It is astonishing what a small matter will do. Unless a cotton broker's office is near the Exchange persons will not walk the length of a street to look at the cotton. It signifies to the purchasers of cotton whether the bulk lies in Birkenhead or on the north shore; after they have purchased they very often wish to look at the bulk. I am told that upon the mahogany lying at Birkenhead there is a difference of 10 per cent. between its lying there and at Liverpool. If the Liverpool Dock Trustees purchase the Birkenhead Docks it is impossible to

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say how we should apply them. We should treat the estate as a whole. I can hardly say what might be induced to go there, and what might not. In the contest between the Corporation of London as to retaining Smithfield, and the parties concerned for removing it, the witnesses on both sides were agreed that wherever the market was there could be but one. I do not think it is possible for a general cargo to be had at Birkenhead; one or two vessels have loaded at Birkenhead, but it has been by a very few individuals who have united, and so sent their goods there to put them on board the vessel, and probably the charterer of the vessel or the shipper of the cargo has been interested in holding Birkenhead bonds, or there has been some local reason for the vessel going to Birkenhead. We have the entire North-Western system at Liverpool; communicating with the manufacturing district of the kingdom we have the Canal, the Lancashire and Yorkshire, and the East Lancashire Railway. The communication we are making with the north docks will be of very great use. It is impossible that the same state of things can exist on the other side; in an old place like Liverpool there are so many interests; every man who wishes to ship a few tons of goods is located on the Liverpool side; it may be coals, or iron, or assorted cargo. A vessel may go to the other side and half its cargo have to come across from Liverpool.

Obstruction from unloading in the stream.

I should not wish to see the stream of the Mersey thick with vessels unloading; it would be the greatest inconvenience to the trade, and the greatest disadvantage to the navigation of the Mersey. In all probability great inconvenience would arise from allowing vessels not to pay these dues unless they used the docks. There are so many vessels coming in and going out every tide that even now there is very often great inconvenience in keeping the entrances to the docks clear. The water bailiff of the Corporation, Mr. Cox, is the officer specially charged with the police of the Mersey; he is the only man who has any power; I do not think he will be here as a witness. Considering the immense number of vessels which upon a change of wind come in and go out, it is very desirable that no more vessels should be anchored in the stream than is absolutely necessary; many vessels must do so, vessels coming in too late to dock or going to sea next day; there is not too much room for such vessels. If the unloading in the stream went on to a considerable extent, we should have docks into which vessels might come, and which we must keep ready for them if they wanted upon an emergency, but which they would not use if they unloaded in the stream, and would not pay us the means of keeping up. I am aware of the recommendation of the Commissioners that it would be desirable as a general rule that no vessel should be charged for any service it does not receive. As a general principle, it is a sound principle, no doubt. But I think there are peculiar circumstances in the case of Liverpool which oppose the introduction of that principle. I think it would be a great inconvenience for vessels not to pay dues upon one side

or the other. It is unfair, as a general principle, that any person should pay for what he does not receive benefit from; but, on the other hand, it is equally clear that no person has a right to receive benefit from that which he does not pay for, therefore it would be equally wrong for a vessel to have the power to go into the Liverpool Docks and also to have the power to keep out of them. The goods must be landed upon our quays, and make use of our property, or the property at Birkenhead in some way or other. The practical convenience of vessels unloading in the docks would be so much greater than unloading in the stream, that they would prefer to pay, generally speaking; but I can conceive that a timber vessel might come in on a fine day in summer and raft her timber in the river, and that would be a great nuisance; the greatest injury might arise from an occurrence of that kind. I think that the general disarrangement in various ways would be a greater disaster to the convenient carrying on of things than it would be an actual benefit to the trade. *C. Turner.* 26 Mar., 1855.

Daniel Powell, examined by Mr. Webster. *D. Powell.*

I am engaged in the corn trade, and carry on a very extensive business at Liverpool. We are labouring under very great disadvantages at present in the corn trade; we have not anything like the accommodation we require, and we have applied repeatedly to the Dock Committee to afford us greater and more central accommodation. The accommodation at present is quite inadequate. It is part of the plan of the Dock Committee to erect stacks of warehouses at George's Dock. That is a very convenient situation as regards our trade; our market is close to it in Brunswick-street; George's Dock is at the bottom of Brunswick-street. The corn trade requires altogether about 250 warehouses of 5 stories each. We consider an average stock of wheat held in Liverpool to be 200,000 quarters; that would require about half the quantity; there will be 20,000 quarters of oats, 10,000 of barley, about 150,000 of Indian corn, and 50,000 quarters of beans, malt, &c., making an aggregate of 430,000 quarters of grain; sometimes it is exceeded, and sometimes it is considerably less. That is an average stock. That would make 3,440,000 bushels. The average number of bushels per square yard is about 20, that average stock would take 170,000 square yards; we should require for 170,000 square yards about 172 warehouses, 5 rooms in each, 200 yards to each room. An average stock of flour is about 350,000 barrels, or equal to that between barrels and sacks. Five barrels go to a square yard. The flour would take about 70 warehouses of the same dimensions as the others; 70 warehouses of 5 rooms and 200 square yards each. I have taken an average stock of 75,000 loads of oatmeal; that would take from 9 to 10 warehouses. The résumé of those figures is, that the corn trade would require 251 warehouses of 5 rooms each, 200 square yards to each room. Last January twelvemonth our stock was considerably more than I have stated. From my experience of the corn

Accommodation for corn trade.

Average stock of grain.

Average stock of flour.

Oatmeal.

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trade that is the average quantity requiring accommodation. The Albert warehouses are not adapted for corn. We represented to the Dock Committee the very great inconvenience and expense we were put to, and requested that they would appropriate George's Dock to the Irish trade and the Mediterranean trade, and the smaller sized class of vessels, from 80 up to 300 tons. I believe the dock would be constantly filled with vessels of that description in ordinary years, probably not such a year as the present, because our own crop being so large we did not require such large importations. Those large vessels in the American trade could not enter the George's Dock. We took the liberty of suggesting at the same time to the Dock Committee that they should give us Wapping Dock for corn-laden vessels; there would be some difficulty in that, because most of the vessels from America come with general cargoes, and in that case we should be obliged to be accommodated at the north end of the town. About one-third of the corn trade could be accommodated at the warehouses in George's Dock; the corn trade is conducted in the smaller classes of vessels I have enumerated. We should endeavour, in ordering corn from America, to get it inserted in the bills of lading that the vessel was to enter the Wapping Dock. I am afraid that the warehouses at Wapping would be too expensive for the corn trade; they would be liable to the same objection as those of the Albert Dock. We must also have accommodation at the north docks if the corn trade is to be properly accommodated. The pulling down and alteration of warehouses has placed us in a worse position than we were formerly. At the Wapping Dock large stacks of warehouses have been removed; the Dock Committee have purchased that land, and pulled down all the warehouses which were before almost entirely appropriated to corn, and the trade has been increasing. We do not require warehouses for corn so lofty or so expensively built. Corn is an article which will not ignite. There are very few instances of ignition of corn warehouses, and we do not require such very expensive warehouses as the Dock Committee are erecting. They are fireproof, and the rooms are too lofty and too large. We do not pile corn above 4 feet high, and we could put six rooms into a warehouse suitable for corn, whereas the Dock Committee only put four or five. The warehouses required for corn, being of a cheaper description, are such as might advantageously form part of the works which the Dock Committee now propose to carry out. The warehouses to which we are obliged to resort are situate in different parts of the town; that is a source of very great expense, from various causes. We have a market every day for corn, though we only profess to have two market days; still corn is an article which is being disposed of every day of the week; the corn offices are all in the neighbourhood of Brunswick-street. If I dispose of a quantity of corn in the morning, I have perhaps to send a gang of men two and a half or three miles. I may send them off at nine o'clock; it will take them an hour and a half to get to the ware-

Corn vessels in George's Dock.

Corn warehouses.

houses. The dinner hour comes at twelve o'clock, when they stop, and I think it is a fair thing to estimate that we could, by having the docks centralised, and in the neighbourhood of our places of business, transact our business at one third less cost than we do at present. One inconvenience that we complain of at present is, that the warehouses being at so great a distance from our places of business we are obliged to employ an extra number of hands as porters and servants; now they are at such a distance from us that we have no control over them. The centralisation of the business, in the way in which it may be done if the Dock Committee are furnished with fresh powers, would be a considerable saving in cartage and porterage, also in loss from plunder. I attribute that loss in a great measure to the distance of the warehouses from the places of business. We have found in several instances in which we have stored the warehouses and filled a room, that when the corn comes to be delivered there is a very considerable deficiency. On all these items, porters, servants, plunder, and cartage, the present scheme of the Dock Committee will, in my opinion, be a considerable advantage to the corn trade.

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Loss from distance of warehouses.

Cross-examined by Mr. Calvert.

Cross-examination.

I understand the Dock Committee intend to enlarge the dock, to make further excavations, to enlarge George's Dock, and to build warehouses upon two sides of it. I have not looked at the report of the Dock Committee; I was in hopes that it was at the instigation of the corn trade that the Bill had been brought in. I certainly am most anxious as an individual, and as one of the organs of the corn trade, that the Dock Committee should carry out this plan so far as to afford increase warehouse room for the corn trade. We cannot be worse than we are. If there be any increase of warehouses in a central position, and the Dock Committee appropriate those warehouses to the corn trade, it will be a decided advantage; they cannot afford us as much accommodation as we want. The quantity of corn in store fluctuates considerably from time to time. This is rather a peculiar year; the crop in this country was so good this year that we have not required the foreign supplies, which we have done every year since 1847; we have had a less importation of foreign grain this year than any year since 1847. We have dealt with the corn in every way we possibly could; the ordinary rent for flour is, for eight or nine barrels, a penny a week; we have had to pay as much as a penny a week for three barrels; our rents have been raised from 50 to 70 per cent., owing to the want of accommodation; we were obliged to deposit it where we could; we deposited some in the Albert Dock warehouses, and some in private warehouses. I have heard it stated that warehouses are very bad property, and I have known warehouses empty for a long time. Private individuals are building new warehouses all along the north end of the town; they are rather too expensive for warehousing corn; necessity has no law, and

Warehouses in central position for corn.

D. Powell, 26 Mar., 1855.

we are obliged to put it there. With the quantity of corn at this moment in Liverpool there is a considerable warehouse space actually vacant.

Sale by sample.

We sell by sample in Brunswick-street, and deliver to the carrier. There is a great difficulty as to those northern warehouses; there are only two streets, and they are very frequently blocked up completely, as bad as Ludgate-hill is sometimes. I have been there when you could not pass for six or eight minutes. At George's Dock we should be equidistant from the London and North-Western and the Lancashire and Yorkshire Railways; we should be quite contiguous to the Duke's Canal, and to all conveyances by land and water. The London and North-Western has two termini, one at the south and one at the north end of the town; we should ship our goods by the southern terminus if we had our warehouses there; we want a central terminus. I ware-

Loss on corn.

housed a cargo, about 2000 quarters, of corn, and it was certainly out of condition at the time, and would decrease in weight in consequence; but I calculate upon a decrease of 3 per cent., and I found when I came to deliver the cargo I lost about 10 per cent., and I attributed it to nothing else but plunder. The corn was discharged from an American ship in the first instance; it came out in bad condition, and was warehoused; before it went into the warehouse it was weighed from the ship to the warehouse, remained there some time, and then was measured again; the deficiency was about 200 quarters out of something rather better than 2000; that was about two and a half years since. I have suffered losses since. It is a matter of constant complaint. I cannot swear that this was pilfering; it is only supposition. There have been repeated instances in which women have been taken up for stealing corn; when they bring the men's dinners they fill their aprons and bags and carry away the corn; they are at such a distance from us that

Loss from pilfering.

we cannot look after them. I have known an instance within the last three months of a man, who was in the employment of a gentleman very largely engaged in the corn trade, being caught pilfering; he had been twenty-four years in his master's employ, who had implicit confidence in him; this man was taken up, and, I believe, has been tried at the sessions. I suppose this pilfering to take place from the warehouses being at so great a distance from the offices; there is nothing more simple than for a man to call a cart or fill a few sacks of corn and put it in, and send it away; we cannot tell anything about that till we redeliver the corn and ascertain the deficiency; it is from our warehouses being so scattered, not that the distance is so great between the warehouse and the place of shipment or unshipment.

A vessel of 1200 or 1500 tons could not get into George's Dock; the American ships are very large; they bring a large quantity of Indian corn and other corn, wheat and flour. They might come up to Wapping Dock; it was intended to be large enough to receive those vessels; a large portion of them must go into the docks at the north. To save

cartage, we get the warehouse which is nearest to the vessel to store the corn. Into whatever dock the corn comes we avail ourselves of the warehouse immediately in the neighbourhood of that dock to store the corn; it would be very inconvenient to depart from that rule; circumstances may make it necessary. If the corn will be long in the warehouse, and we can get a warehouse at such a distance, we calculate whether it would be better to cart it the greater distance or to put it into the contiguous warehouse. Into whatever dock the corn comes we look at the nearest unoccupied warehouse, and have regard to the expense; and if the expense is not too great we use that warehouse. *D. Powell*, 26 Mar., 1858.

Cross-examined by Mr. Hardy.

I have lived in Liverpool upwards of thirty years; I know Mr. Littledale, Mr. Fortwood, Mr. Holland, Mr. Titherington, Mr. Bennett, Mr. Colburn, Mr. Chilton, Mr. Ealing, Leith, Roscoe and Company, Stewart, Carr and Company; they are engaged in a large way of business. There is at present a large block of warehouses existing at the other side of the street, away from George's Dock; they are principally used for general goods; there are some corn warehouses there, and those would be in the immediate neighbourhood of Brunswick-street. There are the Goree warehouses for corn in the neighbourhood of Brunswick-street. Supposing we have 250 corn warehouses occupied in all Liverpool, there would be about 24 or 26 in that part. I have received no information as to any other warehouses being built for our purposes, except upon the two sides of George's Dock; unless we get one of them we shall consider ourselves very badly treated by the Dock Committee. Three-fourths of the trade must remain unaccommodated in that part of Liverpool. The rents in the neighbourhood of George's Dock depend in a great measure upon whether the docks are full, as I explained before to the Committee. If vessels come into any particular dock any person having goods on board is anxious to store them in that immediate locality, and it may happen that one month the prices there may be rather higher than at the other part, and *vice versâ;* it depends upon casual circumstances.

Re-examined by Mr. Webster.

If the Goree warehouses should be removed there would be no difficulty in carrying out the recommendation of the sub-committee. There is at George's Dock a space available for the construction of warehouses in the way shown upon that plan, provided the Goree warehouses were removed. The pilfering, in consequence of the warehouses being distributed in various parts of the town, has been one of the constant complaints laid before Parliament when the question of dock warehouses has been agitated. It is a very great evil in Liverpool as regards its effect on the population, by throwing temptations in their way. I read the evidence of the late Mr. Rushton, the stipendiary magistrate of the Pilfering.

D. Powell, 26 Mar., 1855.

borough, upon this question; the facility for, and temptation to, pilfer, by reason of the distribution of the warehouses over all parts of the town, is a very serious evil.

The larger class of vessels, which could not be accommodated at George's Dock, must take their chance of accommodation at the north end; there is a large amount of tonnage of a class which could be accommodated in George's Dock; two-thirds of the corn trade is carried on in vessels of from 80 to 350 tons.

The Albert warehouses were built for the general trade; they are splendid warehouses; there are not such in the world I should think; they are not suited for corn. The Dock Committee should be enabled to build warehouses of a cheaper description, more adapted for corn; persons engaged in the corn trade would take such warehouses, and allow them a good per-centage. The warehouses belonging to the Dock Committee are not, I believe, ever sub-let; we should be very anxious to hire them of the Dock Trustees; there would be this advantage, that we could conduct our business at a considerably less expense. I do not mean to say the Dock Committee are infallible; they might introduce a better system. Five corn merchants may dispose of a quantity of corn; supposing they had the corn in the warehouses at George's Dock, the Dock Committee employing one gang of men might deliver all those quantities perhaps with five men, whereas five different houses selling a quantity of corn would have to send five men each. Such warehouses in the hands of the Dock Committee would be a great advantage to our trade. In addition to the prevention of pilfering, inclosed warehouses are a great protection to the revenue.

Warehouses should be sub-let.

J. F. Goodwin.

John Francis Goodwin, examined by Mr. Webster.

Inadequate accommodation for corn.

I am a member of the corn trade, and have heard the statement made by the last witness to the effect that about 430,000 quarters of grain may be taken as the average quantity in Liverpool. I have assisted in making up the calculation from the papers, and I fully confirm it. I agree in what he said as to the average number of barrels of flour. The trade for its proper accommodation would require the number of warehouses as stated, namely, 251 warehouses of five rooms, of 200 square yards each. I agree generally with Mr. Powell's evidence. There are some few circumstances he rather shortly stated than over-stated, particularly as regards plunder. The pilferage is a very serious matter to the merchants in Liverpool. I have had in one particular room containing a quantity of corn the locks broken three times, and the door opened, and a quantity of corn taken; what the quantity was taken I cannot say. That was a warehouse at the bottom of Water-street; the last time, one of my men, in going to the room, caught a person in the act of smashing the lock with a large stone; the person was taken by the police and punished by the magistrates. When corn is warehoused at those large warehouses at the north end, they are so far

Pilferage.

away that our warehousemen who superintend the delivery of the corn are unable to pay such attention to them as they would were the warehouses in the immediate neighbourhood of George's Dock. The inconvenience to which we are subjected has been increased by the recent operations of the Dock Trustees in removing warehouses, inasmuch as the warehouses principally used for the corn trade, and particularly well adapted for it originally, were situated about the Salthouse Dock and Seabrow, which have been destroyed to make room for the Wapping Dock. It would be a great advantage to the corn trade if the Dock Committee were empowered to build warehouses at George's Dock; it would be an accommodation about equal to what has been destroyed by increasing the Wapping Dock, and it would be a great accommodation by having corn stored in one position whereby a large portion of the porterage expenses would be saved, and vessels discharging into the warehouses round the dock would put the corn in without any expense of cartage, and the vessels would go into George's Dock and receive the corn from the warehouses again without cartage and at much less expense of porterage. The warehouses required for corn and flour are of a cheaper description than have been hitherto built. If the Dock Trustees will build warehouses suitable for the corn trade, I will take one or two of them myself and pay 6 per cent. upon the outlay.

J. F. Goodwin, 26 Mar., 1855.

Corn warehouses.

John Stewart, examined by Mr. Webster.

J. Stewart.

I have lived in Liverpool all my life, and have had a good deal of experience as to valuing and the value of property in Liverpool. I have conducted the purchases for the Corporation and the Dock Trustees upwards of thirty years. Their transactions during that time have been very large. I have valued the different plots that are shown upon that map, the pink, the yellow, and the purple. The value of those plots is 874,000*l.*; part of it has been agreed for, to the extent of 249,800*l.*

Value of land.

By the arrangement of 1848 the blue portion was to be given up by Lord Derby in consideration of the pink portion being made. What we are to pay Lord Derby for the pink portion represents the whole cost of that plot of land to the Trustees; his Lordship is selling land which was to be made in exchange for the foreshore, and in receiving 90,000*l.* for the land to be made is selling the whole. If the Dock Trustees should take the pink only and not the yellow, the construction of works upon the pink and the blue would give an additional value to the yellow; all other circumstances being the same, it would be of much greater value with the docks to the westward of it than without. I think it matter of good policy on the part of the Dock Trust to secure the whole of that land at a reasonable price. If the land should be required hereafter, more must be paid for it. No doubt the making of docks and works has given a great spring to all the land in that neighbourhood.

J. Smith, 26 Mar., 1855.

James Smith, examined by Mr. Webster.

I am a timber merchant at Liverpool, and have been so between thirty-six and thirty-seven years. I am also a member of the Dock Committee, and in very extensive business there. I was a member of the special sub-committee which reported upon this scheme of dock extension. I have turned my attention to dock affairs for some years.

Growth of dock accommodation and trade.

In 1820 the average tonnage entering the port, taking the five previous years, was 770,942 tons. At that time the dock acreage consisted of 44 acres, or 17,521 tons per acre per annum. In 1830 the tonnage had increased to 1,312,932 tons; the dock acreage had been increased to 72 acres, giving an average of 18,235 tons to the acre. In 1820 the Prince's Dock was in course of construction, and was opened in the following year. The Waterloo, the Victoria, and the Trafalgar, which are the three next docks, were contemplated, but not completed; they were not opened for three or four years after that, but the Clarence Dock and the half-tide Clarence Basin were made for the accommodation of the steam trade: those were the docks which were opened in 1830. The number of tons worked per acre between 1820 and 1830 had increased from 17,521 to 18,235; the acreage having increased from 44 to 72 acres. We had rather more tons to work per acre per annum in 1830 than in 1820. At both those periods the want of dock accommodation was much felt. There had been an increasing want of accommodation. In 1840 the acreage had been increased to 115 acres; the tonnage had also increased to 2,107,400, again amounting to about 18,325 tons per acre, so that we had not gained any additional accommodation measured in tons per acre in 1840. Between 1840 and 1854 the acreage had been increased to nearly 200, but the average tonnage of the last four years has been 3,964,184 tons, or at the rate of 19,820 tons per acre; but if I take the last year, which has been the largest amount of tonnage on record, which was 4,316,583 tons, it is equal to 21,582 tons per acre per annum. Notwithstanding the increase of dock accommodation, there has been a pretty steady increase of the number of tons worked per acre, rising from 17,521 tons in 1820, to 21,582 tons in 1854. In 1820, 1830, and 1840, when you had only dock accommodation to work about 18,000 tons per acre, the want of accommodation was admitted, and steps taken to provide for it. We have now on the average of the last four years had to work 19,820 tons per acre per annum; in the last year 21,582. If there was difficulty at the former periods, it is evident that there must be much greater difficulty in respect to accommodation at the present moment. During the last two years we have been working about 20,000 tons per acre, a much larger quantity than is convenient or desirable. The trade of the port has not been at all adequately accommodated. From time to time there has been great inconvenience from ships having to wait before they could get into dock. Occasionally there is ample room in the docks, but at

Inadequate accommodation.

times, after a prevalence of easterly winds, a fortnight or three weeks detaining ships during that period, there are large arrivals, and at that time there is always very great inconvenience, ships frequently having to remain in the river a week or ten days. *J. Smith*, 26 Mar., 1855.

I have a document on that subject in my hand. On the 23rd of August in last year, I addressed some remarks to the Committee on that subject. With a view to that I requested the harbour master to tell me how many vessels there were in the river waiting to get into the Brunswick Dock alone; he handed me this list; the number of ships is 27. At that date, the 23rd of August, some of them had lain in the river from the 12th. There was 1 entered the river on the 12th; another on the 14th; 1 on the 16th; 2 on the 17th; 3 on the 18th; 9 on the 19th; 2 on the 20th; 5 on the 21st; and 3 on the 22nd. All those ships were waiting to get into the Brunswick Dock, and at that moment there was only room in the dock for 8. When I speak of there not being room in the dock, there was not working room; they might have been admitted to remain in the centre of the dock till there was room; all the berths were at that time filled up. Detention of vessels in the river.

If timber vessels were allowed to discharge in the river without using the docks at all, and without being subject to the payment of any rates, I do not think it would be often done. In the Mersey there is a current running at the rate of four miles an hour, therefore the inconvenience of discharging in the river would always be very great; we have occasionally to do it. A vessel may arrive when the state of the tide will not admit of its entering the docks; it is sometimes an object to get that ship speedily discharged, and we have occasionally rafted timber in the river for the purpose of lightening that ship, and enabling us to get the ship into dock perhaps two days earlier; it is at all times an inconvenience. If I had one of my ships arrive in the river I think I could discharge the timber out of that ship into the river and raft it; but before I had completely discharged the ship I should find it necessary to take in a considerable quantity of ballast or something to stiffen the ship; but if I had fixed a voyage where the cargo that I was shipping was coals or salt, I could get the salt or coals out to the ship in the river and so load her; under these circumstances I might avoid the dock dues, both on the ship and on the cargo inwards and outwards; but practically I think there would be a great deal of inconvenience; it could only be done in very fine weather. Supposing the payment of dock dues limited to those ships which really used the docks, I do not think that the result would, practically, be of much consequence; I believe there would be very few instances in which vessels arriving would not go into the docks either on one side or the other; they must incur dock dues either on one or the other side; practically to discharge a ship in the stream, and load in the stream, would be so inconvenient that I think it would be very seldom resorted to. I do not think that it is of much consequence one way or the other what the rule is. If that prin- Vessels might discharge in the river.

J. Smith, 26 Mar., 1855.

ciple were adopted I can quite understand that in fine weather many parties, for the purpose of saving those dues, would make the attempt; and if an attempt were made to any great extent, it might be possible that the river would be so greatly crowded as to be attended with serious danger; there would be great danger if it were extensively resorted to. We have frequently so many ships lying in the river that there is some danger, and occasionally we have fogs, though we are not much subject to them there; and the danger of removing ships, and of occasional collisions, is considerable.

Danger from extra-crowding of the river.

Practically there is not much of a police; there is a water bailiff, whose duties are very limited. A ship arriving is conducted by the pilot to what he conceives to be a place of safety. I do not know exactly what the powers of the water bailiff are. Practically, good order is found to prevail in the port of Liverpool. Supposing vessels could be discharged in the stream without paying dues, practically I think the safety and the convenience of entering docks would more than compensate for the dues; the exemption would not, I think, produce the practice of frequently discharging in the stream. A cargo of foreign grain purchased by a miller to be sent inland might be unloaded in the river, but supposing this to be done before his cargo is entirely discharged it would be necessary to take in ballast, for the vessel dare not lie in the stream without ballast; the inconvenience of bringing ballast from the shore would be practically so great that I do not think it would be resorted to to a great extent. The cost would be very considerable; certainly not so much as the amount of dues saved. If the option were allowed, and it was very much resorted to, there would be very much danger to the navigation of the river; but if it is only resorted to to a trifling extent there would be no reasonable objection to it; the insurance would practically operate against the practice. I do not think the insurers would be disposed to take the risk; the vessel, under those circumstances, would be considered to have completed her arrival after she had been at anchor twenty-four hours, unless she were waiting to enter one of the docks. The water communication inland to Manchester is a continuation of the river; further up the river you are removed from the crowd of vessels; you get into a space less occupied. A vessel could there discharge her cargo into the raft which is to convey it to Runcorn, and so to Manchester. If done now, the dues are levied for the advantage of docks not used at all. The limits of the port of Liverpool extend to Runcorn, which is from eighteen to twenty miles. On no part of the river between Liverpool and Runcorn can any such discharge now take place without payment of the dues; that must prevent the experiment now.

Inadequate river police.

Vessel discharging in stream must take in ballast.

Vessels having got into dock have frequently to wait ten days or a fortnight before they can get a berth. In addition to delay on the river there is delay in getting a berth. When in a berth they have

Delay in docks for a berth.

sometimes to discharge over two or three ships; with certain descriptions of cargoes this is possible, with others it is not. *J. Smith, 26 Mar., 1855.*

Vessels in addition to being detained in the river in consequence of the docks being full are sometimes detained in the river for want of water; that, coupled with the state of the docks, occasions an uncertainty in the trade as regards the departure of ships, which is of importance to us. We have had repeated applications for berths for steam ships. I heard what Mr. Turner said about the inconvenience that the steam trade was put to, and the necessity of providing for it; I concur in those statements, and I should speak a little further in reference to the Canada and the Brazilian steam packets, which made application to us for accommodation. At present we have a certain number of docks especially appropriated to the steam trade, and special berths given for them. In the course of last year we had application from the Canada, and the Brazilian Steam Packet, Companies, and from one or two minor companies, for accommodation in the Liverpool Docks; the Canada and the Brazilian vessels having been located for some months on the Birkenhead side. It was quite out of our power to give them the accommodation which they required, but we appropriated the south side of the Coburg Dock to those steamers, with the understanding that we could not appropriate a berth, and if one came in and a berth was occupied the vessel must wait till she could take her turn, upon the same principle as sailing vessels. Detention in river from want of water.

The following is a table of the tonnage entering the port of Liverpool, showing the increase at intervals of 5 years from 1826:

Years.	Tons.	Increase on 1830 in Tons.	Per cent.	Increase on 1835.	Per cent.	Increase on 1840.	Per cent.	Increase on 1845.	Per cent.	Increase on 1850.	Per cent.
5 Years.											
1826 to 1830	5)6,564,663										
inclusive.	1,312,932										
1831 to 1835	5)8,184,966										
	1,636,993	234,061	24½								
1836 to 1840	5)10,537,202										
	2,167,440	794,508	60½	470,447	28½						
1841 to 1845	5)12,945,301										
	2,589,060	1,276,128	97	952,067	58	481,620	22¾				
1846 to 1850	5)16,908,429										
	3,381,686	2,068,754	157½	1,744,693	106½	1,274,246	60½	792,626	30½		
4 Years.											
1851 to 1854	4)15,856,736										
inclusive.	3,964,184	2,651,252	201¾	2,327,191	142	1,856,744	88	1,375,124	53	582,498	17
1854	4,316,583	The year 1854 shows an increase of 10¼ per cent. on the largest year on record.									

J. Smith, 26 Mar., 1855.

The following are similar tables, distinguishing vessels engaged in the foreign trade from steamers and sailing coasters:

VESSELS in Foreign Trade.

Years.	Tons.	Increase on 1830 in Tons.	Per cent.	Increase on 1835.	Per cent.	Increase on 1840.	Per cent.	Increase on 1845.	Per cent.	Increase on 1850.	Per cent.
5 Years. 1826 to 1830 inclusive.	5)2,697,774 539,555										
1831 to 1835	5)3,375,321 675,064	135,509	25								
1836 to 1840	5)4,404,502 880,900	341,345	63¼	205,836	30½						
1841 to 1845	5)5,507,509 1,101,502	561,947	104	426,438	63	228,602	25				
1846 to 1850	5)7,229,927 1,445,985	906,430	168	770,921	114	565,085	64	344,483	31¼		
4 Years. 1851 to 1854 inclusive.	4)7,185,437 1,796,359	1,256,804	232¾	1,121,295	166	915,459	103¾	694,897	63	350,374	24

STEAMERS.

Years.	Tons.	Increase on 1830 in Tons.	Per cent.	Increase on 1835.	Per cent.	Increase on 1840.	Per cent.	Increase on 1845.	Per cent.	Increase on 1850.	Per cent.
5 Years. 1826 to 1830 inclusive.	5)1,312,811 262,562										
1831 to 1835	5)1,929,685 385,937	123,375	47								
1836 to 1840	5)3,323,805 664,761	402,199	153	278,824	72						
1841 to 1845	5)4,200,570 840,114	577,552	219¾	454,177	117½	175,353	26¼				
1846 to 1850	5)5,815,338 1,163,067	900,505	342¾	777,130	201	498,306	74¼	322,953	38¼		
4 Years. 1851 to 1854 inclusive.	4)5,278,392 1,319,598	1,057,036	402	933,661	241¾	654,837	98½	479,484	57	156,531	13¼

SAILING COASTERS.

Years.	Tons.	Increase on 1830 in Tons.	Per cent.	Increase on 1835.	Per cent.	Increase on 1840.	Per cent.	Increase on 1845.	Per cent.	Increase on 1850.	Per cent.
5 Years. 1826 to 1830 inclusive.	5)2,380,759 476,152										
1831 to 1835	5)2,495,138 497,027	20,875 increase.	4¼								
1836 to 1840	5)2,327,414 465,483	10,669 decrease.	2	31,544 decrease.	6¼						
1841 to 1845	5)2,639,275 527,855	51,703 increase.	10¾	30,828 increase.	6	62,372 increase.	13¼ incr.				
1846 to 1850	5)3,114,059 622,812	146,660 increase.	30¾	125,785 increase.	25¼	157,329 increase.	33¾	94,957 increase.	18		
4 Years. 1851 to 1854 inclusive.	4)2,600,026 650,004	173,852 increase.	36½	152,977 increase.	30½	184,521 increase.	39½	122,149 increase.	23	27,192 increase.	4¼

J. Smith, 26 Mar., 1855.

There has been a steady increase from 1831 to 1855; it works out in the following way: Going five years further back than this table gives me, the average of five years from 1816 to 1820, the average tonnage for those five years was 770,942; from 1821 to 1825, it was 1,029,660; then we come to the period from 1826 to 1830, which we have in the table I have put in. In 1835 the tonnage was 1,636,993; compared with 1820, which is fifteen years before, there has been an increase of 112 per cent. If I compare the period ending in 1825, with the period ending 1840, which is again 15 years, the increase is 104 per cent.; from 1840 to 1854 there was an increase of 88 per cent.; but if I take the tonnage of last year, it gives an increase of 104 per cent., and looking at that carefully, it appears that ever since 1820, the tonnage entering the port has been doubling itself at periods of from 14 to 15 years. We are providing accommodation in this scheme for more than equal to last year, 4,300,000. It is not double our present accommodation. The whole of the water space represented upon that plan, does not amount to double the present water space. Our present position is this, if we look to the whole of those docks, they are only capable of holding about 300,000 tons of shipping, with those 300,000 tons you can work the docks conveniently; if you can get more than that tonnage in the docks, you cannot work them conveniently, and I believe at the present moment there are in those docks about 400,000 tons, and the consequence is, that not one of those docks can be worked with anything like convenience. The result of the statement just given is, that comparing the increase of tonnage every 5 years since 1820, it has more than doubled itself in 15 years.

Tonnage doubled in period of fifteen years.

[*By the Committee.*—My attention, as a member of the Dock Committee, has been drawn to the accommodation we could obtain at Birkenhead. Great conveniences for the discharging and loading of ships could be obtained there; it would not be equal to one half of the present accommodation, without an enormously increased outlay. The outlay there would not, I think, be much less than the proposed. I cannot speak as to the value of land on the Birkenhead side at the present moment, but if I think of the state of things which existed there a few years ago, they got the price of land to almost double anything on the Liverpool side. There has been a great revulsion since then. Within the last 8 or 9 months Mr. John Abel Smith, who is a large owner of land, wrote to the Chairman of our Dock Committee, to make him an offer of certain land. I do not exactly recollect the price, but I know it was far beyond what we can purchase land for, which would be more convenient for the purposes of dock accommodation. I think it was upwards of 20s. a yard.]

Accommodation at Birkenhead.

In 1848 an arrangement was made with the Earl of Derby, by which, in consideration of making the blocks of land represented in pink, the Dock Estate became possessors of the whole of that land marked blue; we are to give Lord Derby 90,000*l.* for those pink plots; that represents the whole of both the pink and the blue.

Arrangement for land.

J. Smith, 26 Mar., 1855. Increase in steam tonnage.

The increase of the general tonnage from 1830 was 201¾ per cent. During that period the increase in the steam tonnage was 402 per cent.; the tonnage of the sailing coasters has been almost stationary, vessels in the foreign trade have increased 232¾ per cent., so that while the sailing coasters have been almost stationary, there is an increase of the average both of the foreign trade and steamers. The increase in the steam trade has been very great, and has altered the condition of things at Liverpool, in the necessity there is for providing for those steamers. The docks at Liverpool appropriated to the steam trade are (beginning from the north)—The entire of the west side of the Huskisson Dock is appropriated to the Cunard line of steamers; a portion of the east side is appropriated to the use of the Collins line of steamers. We then go on to the Wellington Dock, the south side of that dock we have appropriated to steamers, but not in the same way as we usually appropriate berths; it is appropriated to steamers, but any steamer going into that dock, if she finds the berth occupied, has to wait and take her turn upon the same principle that sailing vessels do; we then go to the Nelson Dock, that is appropriated exclusively to steamers. The Collingwood Dock is appropriated to steamers also in special berths; the Salisbury Dock the same; the Clarence Dock and the Clarence half-tide Dock are steamer docks with appropriated berths, this rapid increase in the steam trade has increased the difficulty of the Dock Committee; owing to their paddles we cannot deal with them in the same way that we can with sailing vessels. On a sailing vessel arriving in the river, the captain must go to the harbour master's office, and enter his ship for a dock; he has then to take his turn. If the docks are crowded, he must wait and take his turn to get into the dock, and then he must wait and enter in the dock master's book and take his turn for a berth. The steam trade could not be conducted on that principle; you can almost calculate to an hour when a steamer is to arrive, and they have their special days of sailing; they prepare by having goods for those vessels brought down several days before, and that trade can only be conducted by appropriating special berths to the different steam companies. A large number of their vessels have been chartered by the Government for the Crimea. If peace should return, we could not find accommodation for them in Liverpool. The Cunard Company alone have 7 or 8 boats chartered by the Government; the manager has told me that the moment these boats are at Liverpool, and they employ them in their usual trade, he shall require the whole of the Huskisson Dock for that particular company.

Different system as to sailing and steam-vessels.

Timber trade.

The timber trade is at present conducted principally at the south end; a very large increase of space is required for the accommodation of that trade. Its removal to the north end of the town would be attended with convenience, and enable us to appropriate the present Brunswick Dock and the Harrington Dock to the purposes of the general trade. I attach importance to that for the convenience of the general trade of Liverpool. The timber trade is very rapidly in-

creasing. Evidence will be given as to the growth of the trade for the last thirty years. I was examined in the year 1848 as a witness. I gave evidence then that the importation of timber was about 330,000 tons; at the present time it is not less than 450,000 tons. Since 1848, a very large increase of the trade has taken place, and it must be provided for by its removal from the south end; it cannot be accommodated there. I believe the north will be the most convenient place that can be suggested in the Mersey, and for reasons which are very easily explained. *J. Smith*, 26 Mar., 1855.

[*By the Committee.*—There are several reasons why the timber trade is not likely to go to Birkenhead. It has been, to a certain extent, tried. The great reason is, that you cannot get two markets so near each other; that has been tried in a variety of instances; and with reference to practical experience there, it has been tried. About the year 1850, I think it was, a number of importers had an impression that, by taking their vessels to Birkenhead and storing their timber there, it could be done more economically than it could in Liverpool; but they found, after getting it there, that it was out of the market, and I think their timber was ultimately sold at a lower price than could have been obtained for it in the Liverpool market. There is a moderate timber trade at Birkenhead now; the locality requires a certain amount of consumption, and a moderate amount goes to Birkenhead now.] Timber trade will not go to Birkenhead.

Taking Liverpool as the central mart, I hold it to be of importance to concentrate the trade in one spot. A very great inconvenience is now experienced, from part of the trade being carried on at the south and part at the north; and it practically speaks to the fact of the difficulty of having two markets. All the establishments of the timber merchants are at the south end of the town, on the Brunswick Dock, and so on; but there is not sufficient to accommodate the trade. The Huskisson Dock is partially appropriated to the timber trade; and all that ground represented by the graving docks, and that dock No. 3, is now used as storage ground for timber. There is not only an inconvenience to the trade which is conducted at the north, but frequently a very considerable loss. An importer of timber who has a ship which cannot get into the Brunswick Dock, would have to go into the Huskisson Dock. An importer who has to go into the Huskisson Dock, and discharge his cargo there, has to take about 5 per cent. less for his cargo than if it were in the market at the south end, and that is a great loss. About 5 per cent. is the average loss. Loss from two markets.

[*By the Committee.*—That is because it is not so favourable a market. It is a mere temporary accommodation, and the Dock Committee make that accommodation as cheap as possible: they do not charge the same rent for the storage of timber upon that ground as upon the new Harrington Dock ground; but the distance is about four miles; and if a customer comes to my office, I cannot get him to go four miles to look

J. Smith, 26 Mar., 1855.

at any portion of the stock I have there. Our present timber market lies very convenient for a timber dealer forwarding his purchases up the river: a large portion of the timber imported into Liverpool goes inland. I do not think there is much difference between it and Birkenhead for an up-river trade. The distance from the Exchange to the extreme north end, is just three miles. The portion of the timber trade which is now conducted at Birkenhead is, I should say, a greater distance than that: you have to cross the river, which is a mile; you have then to walk more than a mile to get where the timber trade is conducted, besides the inconvenience of crossing the water.]

Assuming Liverpool to conduct any timber trade, it is not only an advantage that the trade should be concentrated in one spot, but it will force itself: you cannot have two markets. I attach importance to obtaining a large available space upon which there will be an opportunity of concentrating the trade. As regards the Harrington Estate, the Dock Committee came to Parliament in 1844 for the purpose of purchasing that estate professedly, which was done in ignorance by the Dock Committee at that time, with the intention of making an additional dock for the timber trade; the moment they got their Act and went on to the grounds and commenced making the dock, they found they were obliged to stop; they took that piece of ground from the timber trade, and there is not ground now to be had to store timber.

Operation of two markets.

[*By the Committee.*—The second market for timber works in this way: An importer has a cargo to sell; he comes to me and wants me to buy it. I say the warehouse is a consideration, it is lying four miles from my business, I cannot get my customers to go and look at it. I consequently can purchase the timber stored there at about five per cent. less than I can at what I call the market. My mode of dealing with it is this: I have a very large class of customers who have confidence in me, and send me an order for timber. I have an opportunity of executing this order from timber I may have lying upon that ground. I get occasionally a little advantage. There are many persons acquainted with the fact, and who do take advantage of it, and I am obliged in those cases to take less than I should at the south end.]

Storage ground as essential as warehouses.

It is of importance to the timber trade that there should be a large area of storage ground connected with the dock accommodation. I pointed that out to the Dock Committee many years ago; the storage ground for timber is as absolutely necessary as warehouses for general merchandise. Up to the present time the Dock Committee have never had it in their power to do more than provide a dock, leaving the timber merchants to scramble for ground as they may. We have never had any certainty of tenure; we have had a piece of ground, and it has been taken from us, and the land has been contracting more and more, and becoming more and more valuable. It is absolutely necessary that in any scheme for the timber trade the Dock Committee should not only take

into consideration the proposed water space for the shipping, but the proposed storage ground for keeping the stocks as is done by that plan. At present, persons engaged in the timber trade have to rent storage ground for themselves, wherever they can find it, at the south end, paying a variable rent, according to the price at which parties are willing to let land in the required position. Land varies at the south end from about 8d. to 2s. a yard. The Dock Committee will be able to obtain by this Bill an available space for docks and for storage, and would let that land for the storage of timber at equalised rates; at the same rate to all parties. I attach importance to that in the timber trade as enabling all parties to deal upon equal terms, and I attach importance to a certainty of tenure. That land represented between the dock and the canal is a perfectly level piece of ground, and, with a certainty of tenure, I should not hesitate to go to great expense in putting up appliances for working my trade in the most economical manner. Supposing the Dock Committee to be in possession of this land, and to have an available space for storage ground, it would enable the timber merchants to conduct their trade upon a more economical system than they are now enabled to do. It would put the Dock Committee in possession of available land at the south which they could apply to other purposes. The timber trade must be located outside, and provided that is done, and you have railway and water accommodation, which you have to perfection at the north, you get every convenience that it is possible to have. That locality will communicate with the London and North Western, with the Lancashire and Yorkshire, and with the East Lancashire Railway, and the Leeds and Liverpool Canal.

J. Smith, 26 Mar., 1855.

[*By the Committee.*—There is water communication up the river to Manchester, but we have to cart the timber from the storage ground to the boat. The Dock Committee have a private line of rails along the docks as far as the Harrington Docks. The London and North Western send their waggons to that ground, and the timber is loaded with comparatively little expense of cartage. Timber sent by the Lancashire and Yorkshire Railway is carted to a dock called the Trafford Dock; that is a dock belonging to the Corporation. The timber is carried to the yard, then loaded into boats, sent down the river, and into the Leeds and Liverpool Canal, and then taken to their railway station on the banks of the canal.]

By the proposed plan there will be access afforded not only to the London and North Western Railway, but to the Lancashire and Yorkshire Railway, and the Leeds and Liverpool Canal, and the East Lancashire Railway. Those are the main channels of inland communication from Liverpool. In that respect it has a manifest superiority over the communication at the south end of the town. The trade is now carried on in flats up the river. Supposing the trade to be removed from the south to the north end, the inconvenience in the conduct of that river trade would be this: The boats now start from the south, they would

Timber by flats from the north.

J. Smith, 26 Mar., 1855.

then start from the north end, and in going up to Runcorn, they must start at the period of the tide at which they could take it with them to Runcorn. That would require them to start half an hour sooner from the north than they do now from the south end. It may be said that to a certain extent there is an inconvenience in having to cross in front of the docks, and it might be imagined there would be danger. Against that I put this: that within the last two or three years the Lancashire and Yorkshire Company have loaded their boats at the south end, and taken them down the river into the canal, and to the railway station, without any inconvenience. I do not think they have met with a single accident, or the loss of a single log of timber or a sack of corn.

[*By the Committee.*—Timber vessels cannot go up to Runcorn; they can go about as far as Garston, about four miles up the river. The great majority of ships arriving in Liverpool with timber could not go so far as that.]

The usual practice is to unload the timber into flats, and send them up the river. The inconvenience of having to go from the north end would be nothing more than that they would require to start half an hour earlier. The inconvenience bears no proportion to the inconvenience and expense which is now entailed by the carting of timber. The cartage does not fall upon the carrier of the timber, it falls upon the purchaser.

[*By the Committee.*—There is a dock at Garston used for coals. It is capable of receiving timber; there is railway communication from Garston to Manchester. Parties who go to the expense of making a dock undoubtedly anticipate that it will result in a profit, but it has not resulted in a profit so far. I think Garston has an advantage over vessels unloading in the river. I think a vessel can go into the Garston Docks and discharge the cargo free from the Liverpool Dock dues. I think the Garston Dock proprietors stand in the same position in reference to the Liverpool Dock Trustees that Birkenhead does.]

There is at present no accommodation for the timber trade at Garston. The consumption of timber in the town of Liverpool is pretty large. The position of the northern docks would be convenient as regards the timber consumed in Liverpool. All extension of the docks has been latterly to the northward; all extension of the town has been in that direction, and therefore all timber consumed at the north end of the town has had to be carted from the south to the north, and as the north end of the town has been increasing far more rapidly than the south, and is increasing, practically there will not be so much inconvenience in carting timber from the north to the south as there is in carting from the south to the north at this moment.

Cost of Harrington Estate.

The Harrington Estate cost between 300,000*l.* and 400,000*l.*, and the loss to the trustees from the appropriation of the Harrington Dock to the timber trade is between 11,000*l.* and 12,000*l.* a year. That loss

we should recoup ourselves if we had the means of appropriating the Harrington Dock to the general purposes of trade. *J. Smith*, 26 Mar., 1855.

Of late years the size of vessels frequenting Liverpool has greatly increased. If I go back to the time that I went into the timber trade, thirty-five years ago, a ship of 300 tons would have been a very large one. A few years afterwards we got to 500 tons; we have now a good many ships of 2200, 2300, and 2400 tons. There is no other dock but the Huskisson where one of those large vessels loaded with timber could discharge. Three-fourths of it is occupied by the large class steamers, and one company already tells us that within the next twelve months it shall require the whole. It is absolutely essential that further accommodation should be provided for the large-class vessels to which I have alluded; this accommodation we hope to be able to give by appropriating that space for the purpose. There is another thing in reference to the large-class vessels; all those docks have been constructed when ships of such a beam were not contemplated, and the entrance to those docks varies from 40 to 45 feet. In some of the later docks we have gone as far as 50 feet, but we have got to a class of ships which cannot enter those docks. The large ships which go into the Huskisson Dock can only go through the wider of the two entrances. There are two entrances, a wide and a narrow one; they can only go in by the wide one. Increased size of vessels.

Tuesday, 27th March, 1855.

THE RIGHT HONOURABLE HENRY LABOUCHERE IN THE CHAIR.

James Smith, further examined by Mr. Webster. *J. Smith*, 27 Mar., 1855.

At present there are 16 graving docks; 4 at the south of Brunswick Dock, 2 to the westward of the Clarence Dock, 2 at the Canning Dock, 2 at the Clarence Dock, 6 at the Sandon Dock. It is part of the proposed plan to add other graving docks; 2 of them are intended to have entrances of 100 feet each, which is absolutely necessary on account of the largely-increased size of the American and other steamers. The present graving docks are calculated to hold about 50 ships; they have been so fully occupied for some time past, that my impression is that the average of ships standing on the books waiting for graving docks has been for the past twelve months about 70 to 80, occasionally even more than 100. There has at no time been a greater want of graving docks than at present. There is a passage, from the Sandon Basin to the Huskisson Dock, sufficiently large to accommodate one of Collins's steamers; it is used, as may be observed, generally as a passage Graving docks.

J. Smith, 27 Mar., 1855.

from the basin to the dock, but when there is occasion for one of those steamers to use it, we have to employ it as a graving dock; that is the only way in which we can accommodate the Collins' steamers in a graving dock.

Saving on cartage of timber.

I can form an estimate of the saving that this measure will effect in respect of the carting of timber; at the present time everything has to be carted from the dock to the yard where it has to be stored, and again it has to be carted from the yard to the place of shipment when sold. One advantage of this scheme is, that the tramway waggons will be brought to the timber, and so a large amount of saving will be effected, amounting probably to 40,000*l.* a year. I think Mr. Bramley Moore stated it as more than that. In my opinion it is very desirable that the Dock Estate should take the land coloured yellow on the plan. There are several purposes to which it would be peculiarly applicable. We have at this moment one trade which is almost a new trade in Liverpool, —the copper and the silver ore trade; now it is conducted principally at Swansea; we have now only the crushing. Certain parties introduced the trade a few years ago, and we contrived to locate them at the Harrington Dock Estate. When that property was purchased by the Dock Trustees there was a small dock there; sheds have been erected to the south of that dock, and the parties are located there at this moment, but that dock is so small that it is becoming almost useless for the class of ships employed. That is a special kind of trade, which I think it would be very desirable to have allocated upon this yellow land; last year it amounted to between 15,000 and 20,000 tons; the parties now engaged in it crush the ore only, and it is forwarded elsewhere to be smelted; those parties have told me that if they could have accommodation they should not only crush but introduce smelting works; it might be carried on to the eastward of the canal, on one of the plots of the yellow land. I think it very probable that those parties would take a piece of land of a large extent. That is one of the subsidiary purposes to which this yellow land would be applicable. I have reason to believe that the trade would be increased to a large extent in Liverpool if we could afford proper facilities for it.

Ore-crushing trade lately established.

Ground for ship-building.

For many years there has been a great complaint in Liverpool of the want of accommodation for ship-building; the necessity for docks has made it requisite to take away the ground suitable for ship-building purposes. In addition to the wooden you might have a large iron ship-building trade, which is a very growing trade, and along with that trade there would be marine engine makers and founders. If there was an iron ship-building yard the ship could be launched into that canal, she would then be taken alongside the marine engine-makers' yard, and her machinery put in there with the greatest facility and economy. I am not aware of any other spot in which the Dock Committee could be enabled to accommodate those trades. It is proposed to have a railway running directly into the yellow land, so that there will be a com-

munication not only with the London and North Western but with the Lancashire and Yorkshire, and the East Lancashire, in addition to the passage we now have into the Leeds and Liverpool Canal; it is also proposed to have a second communication into the canal; those are facilities the value of which can scarcely be conceived to the Dock Estate. There is a large plot of ground represented brown, which is the goods station of the Lancashire and Yorkshire Railway, there is a low level railway which runs into that station, they have also a high level railway which is to communicate with the east end of two of the docks, the Bramley Moore and the Wellington Dock; that branch of the Lancashire and Yorkshire Railway was opened yesterday.

J. Smith, 27 Mar., 1855. Connexion with railway and canal.

As regards the circuit of the quay of the Birkenhead, as compared with that of the Liverpool Docks, I can only give my impression from walking to the upper end of the pool at Poulton Bridge and back again; if the whole of that pool were walled round and made available as quayage, it would give 4½ miles. Our present docks at Liverpool have a quayage of 13 miles.

Quayage at Birkenhead and Liverpool.

I heard Mr. Turner's evidence upon the general financial condition of the Dock Estate and its future prospects, and the security which the works afford for the money proposed to be expended; I agree with his opinion. From my experience of the trade at Liverpool, and from what I know of its wants, I think the projected works will yield an income which will be an adequate security for the money proposed to be borrowed. In some remarks which I made in our Dock Committee upon the occasion of the discussion of the report of the special sub-committee, I took another view; I had occasion to speak of what I conceived to be the interest of the bondholders, but I was satisfied of the adequacy of the security on looking at the growth of the trade during the last 30 or 40 years. I put in a document yesterday, shewing that it has doubled itself every 14 years. I cannot conceive that there will be a falling off, but on the contrary a considerable increase; but assuming no increase of tonnage, if we continue the next 12 or 15 years the same amount of tonnage, we should on the average of those 12 years, have year by year the same surplus that we had last year—that was 69,000*l.* We have the Stanley Dock Warehouses, the north stack of which is nearly completed, and is now occupied. The south stack is more than half finished, and will within the next three months be ready for occupation; we have another stack of warehouses erecting at the north side of the Wapping Dock, which will be finished within the next 4 or 5 months—those 3 stacks of warehouses have equal capacity to the whole of the Albert Dock Warehouses, and will produce a revenue of from 20,000*l.* to 21,000*l.* per annum. In my opinion, the revenue will increase as we bring these various works into operation.

Sufficiency of the security.

Increase of revenue.

It is now proposed to spend nearly a million in the further erection of warehouses, which are absolutely wanted; a judicious arrangement of warehouses upon the sides of our import docks, would be one of the

Revenue from warehouses.

J. Smith, 27 Mar., 1855.

most advantageous things which could be effected; I have no hesitation in saying, that every 100,000*l.* which is laid out in warehouses, will produce a return of 7 per cent. The land, which forms a very considerable item of the cost of the warehouses, we have already. Looking to the actual wants of the trade, and the advantages which the warehouses will furnish, I have no hesitation in saying that a million of money will produce a revenue of 70,000*l.* per annum. The question was put to me originally—can those works be carried out with security in reference to the money necessary to be borrowed? I have just shewn three sources of income, 69,000*l.* surplus, 21,000*l.* from those stacks of warehouses, and 70,000*l.*, which, if we spend a million of money, we should obtain from it; that amounts to 160,000*l.* We cannot fail to have a large revenue from the timber yards in addition to that. Supposing the whole of the four millions to be spent in carrying out the plan at the usual rate at which we have had to pay for money, about .4 per cent., the interest upon that would be 160,000*l.* per annum, which would be derived from the sources named, without anticipating any increase of trade. So that I feel, in my own mind, that there is the most ample security for the bondholders, even if the whole of the 4 millions should be spent in carrying out the works. If the reductions which have taken place from time to time in the dock rates had not been made, the present income of the trust would have been about 630,000*l.* per annum. If we had applied that money in the erection of new works, our present bond debt would have been reduced by about 3,700,000*l.*

Cross-examination.

Cross-examined by Mr. Calvert.

I have for a long time given a great deal of attention to these subjects, and taken an interest in dock affairs; more so latterly, during the last 18 months, since I have been a member of the Dock Committee. I have watched the course of events in regard to the docks at Birkenhead. I have had two partners; one, Mr. Horton; the other is my son. The only property my partners and I are interested in, in Liverpool, are some sheds at the south of the Toxteth Dock. That is the whole of our joint property. My partner has about 20 acres of land, 2½ or 3 miles from the extreme north point of the proposed works; my son has no property there whatever.

Rates in Harrington Dock.

The Harrington Dock belongs to the Dock Estate. The Herculaneum Dock has never been formed; there is no dock on the Herculaneum land; but, in reference to the Harrington Dock, vessels loading or discharging in that dock are subject to the same rates as vessels in any other part of the Dock Estate. That dock has never been worked except by the Dock Trustees, who purchased it in 1844.

River police.

There is only the water-bailiff as a river police; I do not know exactly what his duties are, but I think the police rather a matter for the pilots. They understand the river, and they take care to put ships

in a place of safety. Practically, I do not see that there is much of a river police. *J. Smith*, 27 Mar., 1855.

If a vessel discharging in the stream should be free of dock dues on ship and cargo—I pointed out the difficulty there would be—a ship could not entirely discharge her cargo, it would be perfectly unsafe; she must, before she has discharged her inward loading, take in something to stiffen the ship. There would be a very considerable expense in that, probably not to the full extent of the dock dues; but I think, practically, if a vessel could go into the docks and discharge, the convenience would be such that I am of the same opinion that I was yesterday. I do not think practically many vessels would discharge in the stream. Vessels would rarely discharge in the stream.

The Harrington Dock Estate was originally purchased with the intention of making a dock for the timber trade; the Dock Committee went so far as to lay their plant upon that ground with the intention of making a dock; they immediately found that if they did so there was not sufficient ground in the neighbourhood for the storage of timber, and they were obliged to abandon that intention. They paid a large sum of money for that ground; it has only been paying a small rent, as storage ground, and the loss at the average rate of interest we pay for our money would be about 11,200*l.* per annum. Loss on the Harrington Estate.

I was not a member of the Dock Committee at the time, but my impression is that about 30s. a yard was paid for it. As a member of the Dock Committee, I know that the calculation has been made in the treasurer's office, and I know that it has been spoken of among the members of the Committee; I saw the document, but I cannot go into the particulars; I am told that 261,000*l.* was the sum paid for the Harrington Estate. [*Mr. Webster:* It may be taken as 1*l.* 11s. 6d. a yard.] I do not know that it was an enormous sum to have paid for the Harrington Estate. The cost of the land marked purple, which is to be taken from Mr. Leigh, averages, I think, about 1*l.* 0s. 3d. a yard; and the land marked pink, proposed to be taken from the Earl of Derby, will cost about 10s. 6d. a yard.

The Harrington land was accompanied with the privileges contained in the Act of Parliament. I do not think those privileges established a competition with the Dock Trustees. Seven or eight persons made a purchase of the Harrington ground from the Earl of Sefton; they made a river wall about 1841 or 1842, when joint stock companies were a good deal in vogue; they thought that they could get a profit from it, and they formed a joint stock company, and did get a profit.

The parties who originally bought from Lord Sefton paid something like 10s. a yard—it was a mere foreshore. They commenced making it into land; they made a portion of the wall, and laid out a very large sum upon it. But by means of making a joint stock company of it, they got people to take it upon certain terms, and they got a very handsome profit. The last parties who were induced to go into the

J. Smith, 27 Mar., 1855. Outlay on Harrington Estate.

speculation lost very materially in the resale of it to the Dock Trustees. The outlay must have amounted to considerably more than 30,000*l*. I have a recollection of what the land was when they purchased it; I was very frequently in the neighbourhood, and I have a recollection of seeing the alterations which were made in it from time to time, and it must have cost more than that a great deal. There was the making of the wall; they went to the back part of their land, and by means of taking and cutting away from the back part of the land and taking it to the foreshore, they made land. Immediately behind that is very high land indeed, and they cut away and made a perfect level of the whole of that land, and made the whole into land.

The sum paid was not for obtaining the monopoly of the docks of Liverpool. At the period in question we had begun to feel a great want of accommodation in the timber trade; it had been pointed out to the Dock Committee, and I believe they were very anxious to give the facilities required. I recollect very well one or two members of the Committee at that time consulting me in reference to the purchase of that land, and I also recollect the opinion I then gave. I gave an opinion that, watching the rapid progress of the trade of Liverpool, my impression was, that they would be perfectly right in purchasing that land with a view to dock extension. I also pointed out that if they took the land and attempted to make a dock there, till they had provided more accommodation for the timber trade, it was an impossibility. I will not undertake to say that the Dock Trustees did not oppose in Parliament the establishment of the Harrington Docks; I think it is very possible, but of my own knowledge I cannot say. I had nothing to do with dock affairs in the year 1844. I was not in London when the trustees were in Parliament in that year. Mr. Bramley Moore was at that time Chairman of the Dock Committee, and Mr. Jesse Hartley the surveyor. Mr. John Easton was at that period one of the dock masters of the Brunswick Dock.

In 1850 a committee was appointed to inquire as to the accommodation of the timber trade. I was a member of the committee. It made a report, which was adopted at a public meeting of the trade on the 1st of June, 1850. Great differences of opinion had sprung up among parties interested in the timber trade, and who carry on their business at the south end. Many of them, though they had not made any objection in 1848, when the Dock Committee came to Parliament, and did not do so for twelve months afterwards, began to look into the scheme which was proposed at the north end, and they objected to that very decidedly, and with that scheme they preferred remaining at the south end of the town. The great reason that was given by them was that there was not sufficient width on the blue land represented, which was all that was secured by the Act of 1848, and that unless that pink land, which is now proposed to be taken, were also got, there was not sufficient land there to give such a scheme for the timber trade as would

Opinions of timber trade.

be desirable or efficient. The consequence is, that it is now proposed to take that land, and, by means of doing so, you get the plans as they are pointed out. You have your dock in front, timber yards behind it, and a large canal for the convenience of shipping away. That plan has been seen by all the members of the timber trade, and I think I can now say that though they were so strong in their opposition two or three years ago, with perhaps a solitary exception, there is not a gentleman of the trade who is not in favour of this plan. *J. Smith*, 27 Mar., 1855.

Certain sub-committees were appointed by this General Committee, there was a sub-committee called the South-end Committee, which made the following report to the General Committee. "In accordance with the resolutions of the general meeting of parties interested in the timber trade, held at the Clarendon Rooms on the 25th February last year, the South-end Committee proceeded in the first place to ascertain the requirements of the trade, and found that for the storage of timber from 250,000 to 300,000 square yards of land was the quantity required. This being based upon the fact that on the 1st February last, the stock of square timber, deals, &c., reduced to cubic feet was 8,270,251, and occupied a space of 250,275 square yards, whilst the average stock of timber, deals, &c., for the ten previous years was 5,906,056 cubic feet. Your Committee, therefore, assume an additional quantity of 50,000 square yards, or one fifth more for any increase in the trade, making 300,000 square yards of land; but the increased quantity of land which can be allotted by the Dock Committee, and which it appears they amply possess the means of so allotting, will prove most advantageous for anticipated extension, as well as for the immediate accommodation of the trade. Your Committee next proceeded to take evidence as to the quantity of land and water space at the south end, and find that there is in the hands of the Dock Trustees, south of the Queen's Dock, including the Harrington Estate (as furnished by themselves), in square yards, 488,317; land in the hands of timber merchants and their connexions, 45,000; land in the hands of various individuals and let for timber storage, 167,500; land belonging to the two sawmill proprietors, 20,000; land, &c., belonging to Lord Francis Egerton, and used as shipping wharfs, 32,000; and as the streets are included in the north end quantity of land, we have Sefton-street from Brunswick Dock southward 2000 × 20=40,000, making a total of 792,817 square yards. So that we have, if the whole of this was appropriated to the timber trade, 792,817 square yards against 881,129 at the north end, and this within a mile and a mile and a half from the Custom House and Exchange, instead of two or three miles at the north end. Your sub-committee are also desirous of stating that timber stored in water would require at least three or four times the space that an equal quantity would occupy on land, even should it be piled in the water, which they deem highly objectionable, as then nearly all the timber would be out of sight, and that if put into the water in single tiers, ten- Report of South-end Committee on the timber trade.

J. Smith, 27 Mar., 1855. *Report on timber trade.*

times the space would be required; and further, taking into account the peculiar nature and extent of the American timber trade at this port, likewise, despatch so desirable to the shipowner, concentration of business, and facilities for inspection, your Committee are of opinion that on the whole the present system of landing will be found in practice the best adapted for the Liverpool trade. Plans have been made out and produced by one of your Committee, showing how the estate may be laid out with a view to give both more dock and quay space together with storage ground. Your Committee at this stage of its proceedings thought it best to take evidence as to the desirableness of keeping timber in water, and if so, the expense at the ports of London, Hull, and Greenock, have to report as follows." It is not necessary that I should read those items of expense. "Your sub-committee have not gone into the charge incurred by sending timber from the yards to the various shipping wharfs and railway depôts, as they look with confidence to a great saving being effected in this particular, by a judicious development of the resources at the south end. Next as to the consumers buying timber out of water and on land; and on this point it seems to be generally admitted that timber of any kind could not be correctly measured by the string, and allowances made for defects, as is the custom in this port; and if it could, that there is a great objection to keeping American timber, especially St. John's, in salt water. The consumers have also a strong objection to buying timber out of water, in consequence of not being able to see it properly, especially the ends of the timber, and would not give for St. John's pine within 2½ to 5 per cent. for it out of water as from land. Elm and birch may with advantage be kept in water, and Baltic timber without disadvantage. Your Committee are of opinion that by a judicious appropriation of the Harrington Estate and the Toxteth Dock, containing together about 185,000 square yards, and as only 40,000 yards of the Harrington Estate, or about one fourth, has yet been used for the storage of timber, both additional dock and quay space, together with storage ground, may be given there with a canal and railway. Your committee would suggest that the Coburg and Union Docks may be made available for the use of timber if the dockyard be removed, thereby giving increased facilities to the trade. If these additional accommodations were given at the south end, and at a moderate rate, they see no reason why the timber trade cannot be conveniently carried on in its present locality for years to come. In conclusion, your sub-committee beg to remark that if anything could be adduced to give increased weight to the foregoing evidence and observation, it would be this fact, viz., the great expense incurred by all parties engaged in and connected with the timber trade at the south end of the town, under the full conviction of being allowed to continue their operations in that locality. Your Committee think they have now brought evidence before you to prove—1st. That there is land sufficient at the south end of the town for the

accommodation of the trade for many years to come. 2ndly. That the Harrington Estate and Toxteth Dock will furnish about one third more storage ground, besides additional dock and quay space. 3rdly. That it is not cheaper to keep it in water at the ports of London and Hull, though it is much cheaper so to keep it in the Clyde. And lastly, That consumers express a decided disinclination to buy timber stored in salt water, and that any change in the system of measuring timber in this port would meet their strenuous opposition." *J. Smith*, 27 Mar., 1855.

Upon that the following Report was made by the General Committee, and submitted to the trade:—

"There are various interests to be considered in reference to the import of timber, viz., the importer, the dealer, and the consumer. The importer has a direct interest in getting his vessel speedily discharged and sent again to sea; and it is also his interest to sell his cargo when it is landed upon the quay, because it saves him the expense of guarding it, and, so far as he is interested, it would be an advantage if, when he is unable to find a purchaser on the dock quay, he could discharge his cargo into a timber pond, there to float at a nominal charge until a suitable and wholesale purchaser could be found. The timber dealer being generally obliged to sell in retail, is necessarily compelled to yard his timber where he can show his stock to the retail purchaser; and not only from experience, but also from the evidence tendered to the General Committee, retail purchasers, consisting principally of country dealers, cabinet makers, railway contractors, and builders, evince the greatest repugnance to purchasing timber stored in water which they cannot examine, and many have expressed their determination not to do so. Your Committee have it in evidence that a larger price will be given for timber of the same quality stored on land than if offered for sale in water. It is clear that from the plans laid before the Committee, the available floating space proposed to be attached to the contemplated north timber dock will be small as compared with the import, and that the great bulk of it must of necessity be yarded. The entire floating space which the land will allow is less than 100,000 square yards, and it being both unadvisable and impolitic to float timber two baulks deep, they find that, allowing for the division of cargoes for passages and working room in removal, all the space which it will be in the power of the Dock Committee to appropriate will barely float half a million cubic feet, or about one-tenth of the actual import of last year. If at the south end, the Dock Committee will appropriate the land purchased from the Harrington Company to the timber trade, and it was assigned before Parliament that the land was to be purchased for that purpose. They have the means of adding 106,210 square yards to the 212,500 yards now in the hands of the timber merchants and other parties, exclusive of all wharfs and land in the possession of the saw-mill proprietors, making a total of 318,710 yards, or 76,159 yards more than can be had at the north, and unless by extension still further to the northward in the direction of Waterloo, Report of General Committee of timber trade.

J. Smith, 27 Mar., 1855. *Report on timber trade.*

or leaving the dealers to rent land from Lord Derby. Your Committee are, therefore, of opinion that, so far as yarding timber is concerned, it would be in a great degree the mere transfer of the rent now paid to a number of owners at the south, where competition superinduces moderate rates, to one individual landowner at the north, who enjoys a monopoly present and in reversion, and who declines to state the terms upon which he will let his land until the dock works in that neighbourhood are nearer completion. Your Committee have directed their attention to the number of ships that can be accommodated at each end, and whatever can facilitate the despatch of business is indirectly a benefit to the consumer. They find that the projected North Docks will have 1553 lineal yards of quay space, or accommodation for 130 vessels lying close together; allowing 30 yards for each vessel to discharge its cargo, there will be room for 51 ships actually discharged. Including the enlargement of the Toxteth Dock, there will be 1056 lineal yards of quay space at the south end, affording room for 88 ships to lie close together, or with space to work for 35 ships to be at one time discharging. But it must be stated that this is exclusive of the Coburg and Union Docks, and also of that portion of the Queen's Dock now available for the discharge of timber. And your Committee are of opinion that the Coburg and Union Docks ought to be appropriated to the timber trade, as they are in every way suitable for landing deals and short timber; and that if such appropriation was made, there would be ample accommodation for many years to come, and the enormous outlay contemplated at the north shore may be prevented. Your Committee have not deemed it necessary to enter into any details with reference to the accommodation likely to be afforded at Birkenhead. But it is clear that that estuary affords many and striking advantages, especially with reference to the large quantity of timber sent into the interior of the country; and they do not desire to conceal the fact, that as there are no dock rates on cargoes entering the port of Birkenhead, and as that estuary possesses advantages equal in many respects and superior in others to those on this side of the river, and as those advantages have been ably explained to your Committee by Mr. Rendel and other practical men, they are of opinion that, whatever accommodation may be given here, some portion, and probably a considerable portion, of the timber trade will necessarily become located there; and it is highly probable that such location will be greater than any general increase of the imposts which we may legitimately anticipate. This ingredient in the question is deserving of very serious consideration by our Dock Committee before incurring so large an outlay at Bootle, and at so great a distance from the centre of business. From the valuable statement made by Mr. Braithwaite Poole, the Goods Manager of the London and North Western Railway, it appears that of the quantity of wood conveyed into the interior, 13 per cent. goes by railway, 66 per cent. by the river and the canal, and 21 per cent. remain for consumption in Liverpool and its immediate vicinity. Of the 79 per cent., or 217,000 tons sent inward,

there went by the London and North Western Railway Company 30,000 tons, by the Lancashire and Yorkshire and East Lancashire Railways and Leeds and Liverpool Canal 12,000 tons, and by the Duke's old Quay, and other carriers by water, 175,000 tons. All the latter was transhipped at the south end of the town, and looking at the bulky nature of timber, and at the large proportion which its carriage bears to its actual value, your Committee think, that whatever may be the facilities afforded by railways, it must be admitted by all who are unprejudiced that our river navigation will continue to be the principal means used for the transport of wood to the interior of the country, and particularly to the manufacturing districts where the bulk of the timber has hitherto been consumed. The principal carriers by river navigation are all located at the south, and have their establishments complete; and your Committee do not think that the advantage held out by the northern railways will prove in operation to be an equivalent for depriving the carrying companies at the south end of their present advantages, particularly when they reflect that the London and North Western Railway Station in Wapping, as well as all the great river-carrying companies' yards, can be connected with the timber trade by railways on the dock quays in the same manner as is proposed with the canal and railways at the north end, but with the further advantage that those at the south end are on a level with the timber docks, while those at the north, with the exception of the Victoria Station of the London and North Western Railway, opposite the Waterloo Docks, are about thirty-six feet above the level of the contemplated dock quays, and must necessarily be connected by inclined planes of a steep gradient, a course which your Committee think will prove to be highly inexpedient. Your Committee have reason to complain that a trade which has contributed so large a portion of the dues of the port has not enjoyed hitherto those facilities which it ought to have possessed, and, looking at the fact that many of the timber merchants have incurred an immense outlay and made large investments at the south end for conducting their business, that a most serious depreciation of property must be the result of their removal without their procuring correspondent advantages in another situation, and finding that the Dock Committee have not incurred as yet any outlay on the north shore in the formation of the intended timber docks or canal, they are of opinion—1st. That the removal of the timber trade from its present locality is unnecessary, and will prove to be inconvenient. 2ndly. That it will not cheapen the average cost of transit into the interior. 3rdly. That by the judicious appropriation of the land purchased from the Harrington Company and the enlargement of the Toxteth Dock, great convenience will be afforded to the trade at a small cost compared with the enormous outlay at the north end, the increased interest of which outlay must be borne by the general commerce of the port. 4thly. That the removal of the steamers to the north docks, which appears to be their natural situation, will leave at liberty the Union and Coburg Docks, and that these

J. Smith, 27 Mar., 1855. Report on timber trade.

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ought to be appropriated to the timber trade should further accommodation be needed after the adaptation of the Harrington Estate to the purposes of that trade."

I opposed the adoption of that report; I cannot recollect how many voted with me; it was carried.

Monopoly of land in Dock Committee.

Around the Harrington Dock there is land which might be purchased by private traders. The Dock Committee, by the arrangements now made with Lord Derby, have such a monopoly of the land, as will give an accommodation to the timber trade which it never had before. If that conditional agreement were not to take effect, there will be in truth an exclusive possession of the favorable land in Lord Derby; if it does take effect, the possession will be exclusively in the Dock Trustees.

Transport of timber.

The timber is taken from the dock up the river in floats or flats; the barges, which they call floats, carry about 50 tons; they are about 70 feet long and 14 broad, they are made of the right size to go through the locks of the Bridgewater Canal and the Irwell. Those floats, to the number of 6 or 7, are fastened together, and then taken with the flood tide up to Runcorn. They start at a period of the tide early enough to take the tide with them the whole way to Runcorn, and have, therefore, left the docks before the time of docking or undocking ships. The shipping comes in as early as possible on the flood tide; if a ship comes in very early upon the flood, it will come to an anchor and wait for the opening of the dock gates, so that they may enter the docks. Ships will not be coming to the ground at the mouths of the basins at the very time that those floats are going up the river. I never saw Mr. Bramley Moore's evidence of 1844. I have heard that the reason given at that time for having the timber at the south instead of the north, was the great inconvenience which would arise from floats passing up the river while ships were entering the docks. (*f*) I recollect pointing out at the time that they were entirely in error in the proposition then made. Whether you go up or down the river, the traffic by barges is going on at a period of the tide when there is very little doing in the way of docking and undocking ships.

No interference with the shipping.

The westerly wind is the prevalent wind; it prevails perhaps for three fourths of the year. I have known the floats to be detained for a day or two in consequence of the weather, high winds cause detention from time to time. Liverpool is a lee shore with a west wind. That would to a certain extent increase the difficulty of going in and out with floats when any such wind was blowing. In the management of the timber trade it is of very great importance to conduct things as economically as possible, to have plenty of space, and to avoid delay.

Quayage at Liverpool and Birkenhead.

I have been round the Birkenhead Docks; it is about 4½ miles to walk round. In calculating the 13 miles of the Liverpool Docks, I go from the Toxteth Dock to the Huskisson Dock, where the fort stands.

(*f*) The witness was referred to the evidence given by Mr. Bramley Moore in the House of Commons, 29 March, 1844.

As the crow flies, that distance is about 3½ miles or 4 miles; or between 7 and 8 miles going there and back. By making jetties at the Birkenhead Docks, you could get a larger amount of quay space, but that would involve a very large outlay of money. *J. Smith*, 27 Mar., 1855.

In Liverpool the dock sills are about 6 feet below what is called the Old Dock Sill, and consequently there are low tides when there is not a sufficient depth of water to dock ships. I understand that the Birkenhead engineers profess that they will be able to put the sills of their docks 10 feet below the lowest water. It is an advantage to be able to dock ships at any state of the tide undoubtedly; there are a great many tides in the year in which at Liverpool you cannot dock ships. Depth of sills at Liverpool and Birkenhead.

It is convenient to thrust timber out of the port-holes into the water, where it would be formed into rafts. The space covered by water at Birkenhead is from 140 to 150 acres; having the timber formed into rafts, you could, having smooth water, take the rafts to any part of the bank without difficulty. I am aware that at Birkenhead there is abundance of land round the pool. I do not know anything as to the value of it. Barges might be loaded in the pool, and brought out into the river without any inconvenience, and I think the spot where they would come out, would be a little to the south of the centre of our docks. Those floats might, without interfering with the traffic of the river, be taken out of the Birkenhead Docks up the river to Runcorn; but there is one point to be observed in the barges being taken up to Runcorn,—there is a desire as far as possible to keep as much out of current as they can, and my impression is that there is less current on the Liverpool side, and that the barges go up on that side of the river rather than the other, in which case there must be a crossing of the river, which is very inconvenient. In addition to the means of water communication for timber from the Birkenhead Docks, there is the Birkenhead Railway coming down to the dock and running along the quays. That is a narrow gauge railway communicating with all the narrow gauge systems of England. I do not know the distance from Birkenhead to Manchester; I rather think it is about 50 miles; nearly double the distance from the Liverpool side to Manchester by rail; my impression is that the railway company on the Cheshire side, though they have to take timber a distance of 50 miles instead of 30, does not make any greater charge for it. At Birkenhead no doubt there is abundance of water space, abundance of land unoccupied, and as far as the mere discharge of the ships and storage goes, there would be abundance of room. Discharge of timber into the water. Timber floats from Birkenhead.

The Waterloo and the Victoria Docks worked last year about 30,000 tons per acre, I believe, but those two docks have been appropriated to the American trade, which is conducted in ships of a very large class; the trade is so extensive that the ships are loaded very rapidly, and the average time taken in loading ships in those two docks is not more than ten days. It was conceived to be a great advantage in reference to those docks to appropriate them to that particular trade, and in the Waterloo Docks there are berths appropriated to the New York line of Tonnage in Waterloo and Victoria Docks.

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packets, to the Philadelphia packets, and to the Boston packets, and some to the Baltimore packets. By making appropriated berths for those, which is the only instance in which we do it for sailing vessels, we have got an amount of work out of those docks which we have not out of the others. The hydraulic crane is a species of machinery which renders it possible to do a much larger quantity of business in the docks than used to be done without it. The Albert Dock, of seven acres and a half, is purely an import dock; that is, a dock into which a vessel goes on arriving inwards with her cargo: she cannot remain there to load; that vessel must go into another dock to load. In the Albert Dock she may discharge her cargo probably in eight or ten days. We have appropriated the Salthouse Dock as an export dock to that dock, so that vessels which usually discharge in the Albert go into the Salthouse Dock to load; therefore those two docks must be taken together, and between the two I think last year they imported about 230,000 or 240,000 tons, which will be found not to exceed about 14,000 tons per acre per annum, and it is probably the best criterion you can have of what can be done with about the average of the trade in sailing vessels.

Effect of machinery.

By the use of machinery you can undoubtedly discharge a ship in considerably less time than you can by the old-fashioned mode of discharging vessels. In the Stanley Dock, by means of this machinery, you can take four bales of cotton at one time out of the ship's hold. It is done in a moment almost. It is put on to the dock quay and sent off to the warehouse. A dock with, will accommodate double the quantity that a dock without, warehouses will. There is no stronger advocate in the Dock Committee than I am for a judicious arrangement of warehouses around our import docks. The statement of tonnage given yesterday is of tonnage into the harbour and paying dues to the Liverpool Dock Estate. There is a small portion which goes up to Runcorn which does not enter the docks. The statement of the tonnage which comes into the port does not enable you to ascertain the quantity of tonnage which comes into the docks with accuracy. A great deal of tonnage which goes to Runcorn is a Welsh tonnage, slates, and so on, but many of those small craft return into the Liverpool Docks and take an outward cargo, but there is no means of accurately telling the exact quantity of tonnage which enters the docks. I was present at a meeting of the Committee on the 3rd of August, 1854, and remember Mr. Barber making a statement with reference to the vessels discharging at Runcorn. I am not in a condition to disprove that statement. I know there are about 200,000 tons going up to Runcorn, and coasting steamers may arrive with cattle occasionally; they can, without entering the dock, go alongside the pier, and discharge their cattle, but I think 500,000 tons is a mere estimate, and I think Mr. Barber was in error. The tonnage I have given is the tonnage paying rates to the Liverpool Docks. The tonnage which enters the Birkenhead Docks is not included in that statement. Tonnage that has gone into the Birkenhead Docks, and afterwards into the Liverpool Docks, is included. The yield of the

different docks in reference to acreage is very unequal. The Clarence Dock and Half Tide Dock were the docks originally appropriated to the coasting steam trade. They were made for that trade. The City of Dublin Company, and the Glasgow Company, and some others of a large class have all berths appropriated in those docks. The Dublin Company has a boat coming in this morning; she is discharged and loaded, and goes off again to-night, and that dock appears to do a large amount of work, but it is not sufficient for the entire coasting trade. We have a coasting trade where the number of boats is not so numerous, and we are obliged to appropriate the adjoining dock, the Trafalgar Dock; that is appropriated to companies which may not run more than one, or two, or three boats a week. Still it is a trade we are obliged to provide for. The result is, that comparing the Trafalgar Dock and the Clarence Dock, both of which are employed in the same way, the result is very different indeed, but it is one we cannot avoid.

J. Smith, 27 Mar., 1855. Unequal yield of docks per acre.

There have been a great many suggestions as to better regulating the accommodation which we have. Parties have spoken to me over and over again that really know little or nothing on the subject; we have had a great many suggestions from parties who do not understand it. If they were to sit as I do, week by week, in the Harbour Master's Committee, hearing the complaints, and seeing the difficulties we have to contend with, many of those parties who throw out those suggestions would very much change their opinions. I include in that remark members of our own Dock Committee. We are divided into a number of sub-committees. Warehouses come under one sub-committee, and any member of that sub-committee may be able to speak much more satisfactorily of the warehouses than I can. Matters connected with the harbour master come under our notice; any member of that Committee knows more of the difficulty we have to contend with than those who do not attend the Committee. Members of our own Dock Committee have raised these various objections. Mr. Barber, in reference to the Trafalgar Dock, which I have explained to him over and over again. Mr. Gregson, a great timber merchant, has raised them. Mr. Evans has raised many objections. I do not know that he ever raised that particular objection; I do not think he did.

Suggestions for more uniform working.

In 1848 I approved of the policy of going to the north, on the ground of the smallness of the payment which would be made for the land. At that time it was proposed to have made a float, not one so perfect as that, or at anything approaching the expense. Mr. Bramley Moore gave it in evidence, that from the price of ground there he could afford to let storage ground for timber at about 3d. a yard per annum. I was not a member of the Committee at that time. One of the objects in the Bill of 1848 was to obtain storage ground at a low rate; according to the present plan it is supposed that the land will cost from 9d. to 1s. a yard. The plan now proposed is one so much more perfect than the plan of 1848, that the land which is proposed there for timber-

Plans of 1848.

J. Smith, 27 Mar., 1855.

yards would be cheaper to a timber merchant at 9d. a yard per annum than the previous plan would have been at 3d.; it is a great deal more a question of facility for the working of our trade than a question of mere rent.

Return from warehouses.

I receive more than seven per cent. upon the cost of my warehouses. The warehouses which have been erected, of which we have a sample, are erected upon the most perfect system. They are made fire-proof, and the amount of repair that these warehouses will require will be the most trifling indeed for years to come. When we talk of seven per cent. being returned from any buildings, it is not the fact that two or three per cent. must be deducted to pay for insurance and repairs. There is great difference in the quality of buildings. It is quite possible, if you go to the expense in the first instance, of making your warehouses as perfect as possible, your repairs for a very long time will be exceedingly trifling, and I am satisfied that that is the case in reference to the warehouses which have been erected. Mr. Goodwin said he would give six per cent., but he meant six per cent. not only upon the cost of the warehouse, but upon the value of the land upon which that warehouse was erected. The fact of his being willing to give six per cent. upon the cost both of the land and the warehouse, is the strongest evidence that when I say seven per cent. upon the mere outlay where the land costs us nothing, it is a very low estimate indeed.

Increase of bond debt.

I have examined into the increase of the debt which has taken place at Liverpool since the year 1826 with great minuteness. My impression is that at the time of making the Prince's Dock there was no debt upon the Dock Estate. In the making of that dock a debt was incurred of from 400,000*l.* to 500,000*l.* I dare say the interest upon the debt now is greater in proportion to the revenue of the estate than it was some years ago. If you go back to the time that the debt originated, in 1810, upon the making of the Prince's Dock, the revenue, as compared with the debt, would be very large indeed. Now that we have got such an extensive concern, the revenue, as compared with that, has wholly altered. If we were to go on with great rapidity with these works, and incur a very large addition to our bonded debt, I would not dispute the possibility of its being necessary to raise the rates. We cannot spend more than about 300,000*l.* a year; we commence with a certain work, and if we find there is a falling-off we shall slacken our pace—we should take a longer period to carry out the works; we must be guided entirely by circumstances, but judging from the very rapid increase on any average of years, I do not look for that falling-off. I think the apparently small surplus of a year or two before can be to a certain extent explained; some of our docks have been a long time made and are getting out of repair, and for the last two or three years there has been a much larger amount laid out in putting those docks into thorough repair than there had been for many years before, or is likely to occur again. If we went on increasing

our debt at a rate at which the revenue would not pay the interest, we must necessarily raise the rates. I did argue, and I do argue, if I look forward to the next twelve or fifteen years which it will require to carry out those works, that there will be an increase of trade, which will make the average of the twelve or fifteen years as good as the surplus revenue of the last year. In my speech, before making the statement that the surplus income of the Dock Estate for the year 1854 was 69,000*l.*, I remarked that although the past year must be looked upon as an exceptional year, still, looking forward to the period it would require to carry out these works, I did assume upon the average of the twelve years I might look for such an increase of trade as would give us fully that average; that was my argument. The declaration is made actually upon that definite sum. The present water-space of our docks is about 200 acres; 178 acres of docks, and the remainder basins. We propose to add by the scheme now before the Committee about 140 acres water-space, with a dock of 15 acres; there it is proposed that you shall have the opportunity of storing timber in the water by way of trying the experiment, so that as far as the discharging of ships goes the increase will be about 120 acres. About 340 acres will be the entire quantity if our plans are carried out. Taking the varied character of the trade, you cannot work more than 17,000 to 18,000 tons per acre conveniently. With warehouse accommodation and proper hydraulic cranes, and the most modern machinery for working the tonnage, I do not think the gain would be very great. It will be seen that you may by hydraulic machinery discharge a ship in two which would require ten days; but the difficulty is in loading the ships; a vessel after she has discharged takes a loading berth, and probably it takes her a month, six weeks, or two months to obtain an outward cargo. They can always stow their cargo faster than it comes for them to take in; you never by any chance get a ship loaded in the actual time you might, provided there was abundance of goods for the purpose.

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We shall have accommodation for 6,000,000 tons upon our own calculation; that would be an increase of nearly fifty per cent. upon the present tonnage entering the port; fifty per cent. upon the average of four years. Supposing we carry out all our plans and give all this accommodation, I cannot tell what is to become of the Birkenhead Docks; but as a member of the Dock Committee I feel that I must look to Liverpool interests, and I am satisfied in my own mind that Liverpool is the locality where the trade is settled down. I have only one duty to attend to, which is to endeavour to afford, as far as I can, all the facilities I can for carrying on the trade; if we are to pause, we must necessarily drive our trade away; if we are not to find accommodation for that trade which would naturally locate itself in Liverpool, we must drive a portion of the trade away. As a member of the Dock Committee, I do not conceive I shall be doing my duty to do that, without any reference to Birkenhead.

Liverpool interests to be regarded.

J. Smith, 27 Mar., 1855. Public will not go to Birkenhead.

For some years past there has been a certain amount of accommodation at Birkenhead that has never been availed of to the extent of the same amount of tonnage per acre that we are obliged to find for the trade on the Liverpool side. You have your Morpeth Dock and a large portion of the pool available, but the public will not use them; and it appears to me that it arises from the fact that the trade locates itself in a certain position, and in spite of the facilities you already have, they are not availed of to the extent that you have them. To look at the Morpeth Dock as the entrance into the harbour, may not be the only point of view to look at the prospective advantage of the Birkenhead Docks. I have already stated that Birkenhead is capable, so far as the water-space is concerned, and so far as there being an abundance of uncovered land, of having a trade to a very large extent; but I think that the trade has settled down on the Liverpool side, and seems unwilling to avail itself of other accommodation. I never understood that the Morpeth Dock was only made as a temporary entrance.

Re-examined by Mr. Webster.

Notwithstanding any question as to the number of tons which may be worked under special circumstances in the docks, I am of opinion that the state of accommodation generally is such as to demand this proposed extension. There was a larger expenditure than usual in 1852, 1853, and 1854, in putting many of the docks into thorough repair; there has also been considerable expenditure upon the Wapping Dock, and similar works which are yet unproductive. I should think the interest must be as much as 28,000*l.* per annum. I do not know what the cost of the land was, probably the most expensive that could have been applied to dock purposes; the land when bought was covered with warehouses; my impression as to the cost of that land would be only as a mere observer of what was doing at the time. Though not a member of the Committee, I thought it very unfair that the whole cost of those improvements should have been charged to the Dock Estate; it was more a town than a dock improvement. It was a very large expenditure, at present unproductive, the interest of which is charged to revenue.

Improvement of town at cost of Dock Estate.

There is an additional source from which we get something towards keeping up that surplus, which is the Stanley Dock Warehouses, from which we have not yet received anything; the north stack was only completed about 3 months ago, and nothing derived from them went to the credit of the revenue last year; we shall have that in future. I was a witness in 1848. Notwithstanding what might have been said then as to land being furnished at 3d. a yard, with the facilities afforded by this plan I consider that the land will be cheaper at 9d. a yard, than it would taking the plan of 1848 at 3d. In 1848 these questions as to the relative advantages of the north or south end for the timber trade, as regards the getting away of the flats, was thoroughly gone into; the questions which had been urged respecting the navigation were

Land cheaper than under plan of 1848.

thoroughly gone into then. When these matters were considered in 1848, I was of opinion that those who objected to the north end were in error; the experience of the working of the north end confirms that opinion. There has been a great deal of trade done there. I have not changed my opinion upon the point, but I believe that nearly all the parties connected with our trade have; I think, almost with a solitary exception, they have all come round to the opinion that the timber trade can no longer be conducted at the south end, and that it is necessary to go to the north; they have had that plan submitted to them, and they are all delighted with it; I believe, with a single exception, they are all perfectly delighted with that plan. *J. Smith*, 27 Mar., 1855. Approval of timber trade.

The reports referred to of the timber trade were made in 1850. In 1844, when the Harrington Dock was purchased, the project was to accommodate the timber trade there; the circumstances are so much altered, as regards the better knowledge of the timber trade as to the accommodation they would require, that the opinion of the timber trade is almost universally changed. The Harrington Dock was purchased by the Dock Trustees under the Parliamentary powers obtained in 1844.

Examined by the Committee.—I am one of the 12 members of the Dock Committee elected by the dock ratepayers. Neither Mr. Barber, nor any of the others that have been mentioned, who seem to think that by an improved management of the docks we might have sufficient accommodation, are members of the Harbour Master's Committee. What might be the effect in a sanitary point of view of the introduction of the smelting trade into Liverpool, I cannot say. I only know that parties who are at present engaged in that trade merely as crushers, have expressed the opinion that, if they had facilities, they should be very desirous to introduce the smelting trade in addition. I moved that the subject of extending these docks should be taken into consideration. We sat for the first time on the 7th of January; we sat weekly till July; it was a Committee of 14. At the commencement of our deliberations I have no doubt such a plan as that would have startled the majority of the Committee; but from time to time one after another became convinced, and I believe, with two exceptions out of the 14, all were perfectly satisfied that the plan proposed was wise and judicious. We had reports from the surveyor; we gave him a general idea of what we thought would be the best mode; upon that he prepared plans; they were discussed, some rejected, and new plans formed. The plan now proposed is carrying out as nearly as possible what has been the idea of the surveyor for some years. After the report of our Committee came before the public, a deputation from the Chamber of Commerce waited upon the Committee. The Chamber of Commerce is composed of merchants in the town, who become members by annual subscriptions of a guinea. It embraces a great number of the leading merchants in the town, representing the interests of the merchants in the town; those who trade directly from the port, equally represent the interests of the

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merchants lying in the district of South Lancashire who have connexions with the port. The interests of Liverpool and of the manufacturing districts are so blended together that you cannot separate them. The Chamber of Commerce passed a resolution that they would not go beyond an expression of the general opinion of the chamber, that increased dock accommodation was required. They would offer no opinion as to it, but suggested that it was desirable that the best engineering talent in the country should be obtained as to the best mode of obtaining that accommodation. They suggested to the Dock Committee to employ other engineering talent than previously brought into requisition. We have not employed other engineers. With reference to engineering talent, it would have been desirable if we had been proposing to make any alteration in the line of wall of the river; but with reference to a mere dock question, the making of docks, I maintain that the merchants of Liverpool, who know the sort of docks which are required, are more competent to judge than any engineer.

Request of Chamber of Commerce.

The representatives of those merchants requested us to employ other talent than we had previously employed, to investigate the whole subject of the best accommodation to be provided in Liverpool for docks. I can explain why we disregarded that request. The resolution was—"That the attention of the Dock Committee be again respectfully called to the recommendations and suggestions made to them by this chamber in their report and resolutions of October, 1851, and that the chamber regret that dock extension on a large scale should have been decided on without, so far as they are informed, the whole question of the estuary, the docks, and the railway accommodation connected therewith, having been submitted to the highest and most competent engineering talent." They admitted the general principle, that greatly-increased dock accommodation was required; but they threw out the suggestion of employing other engineering talent to consider the question. In the Chamber of Commerce itself, from conversations with a number of members of that Chamber and members of the Council, I knew they were labouring under many erroneous impressions; they did not know what the Dock Committee were going for. Many were under the impression that we were proposing to carry our docks a long way to the northward. We do not go one inch beyond our present boundary; all we propose to do is to go to the eastward.

I think the reply that our secretary was ordered to send to the chamber was, that the subject to which they drew our attention had received our consideration from time to time, and was still under our consideration. A deputation came from the Chamber of Commerce, and they mixed up not only the dock extension, but there was one large party who were desirous of having a high level railway along the whole line of docks, and there were some other questions; by this plan there are certain portions of the road where a railway would be an entire impossibility, unless the town join us in carrying out the improvements in Bath-street and at Queen's Dock. If the Corporation do that, we shall

High and low level railway.

get a wide thoroughfare from one end of the docks to another, and then the question of a railway, whether on a high or a low level, could be considered. I think that the report of the sub-committee refers to that very question. J. Smith, 27 Mar., 1855.

At the time when this request was made by the Chamber of Commerce, no negotiations were going on between our Dock Committee and the Birkenhead Dock Company; we took no steps to discuss the whole question of providing additional accommodation in any part of the estuary of the Mersey in consequence of this. That request made no difference whatever in our plans. Those plans, as now embodied in the proposed scheme, have been objected to by certain members of our Dock Committee. The question was discussed; the report of that sub-committee was adopted by a majority of 15 to 3. When it went before the Council for confirmation, there was no division upon the question; it was confirmed unanimously. Mr. Hornby made some objections at the meeting of the Town Council, but he thought they were not sufficient to justify him in moving an amendment. I cannot go into the particulars of the objections made by Mr. Hornby; I know that the result was that the proceedings of the Dock Committee were confirmed without going to a vote; unanimously, in fact. I am not a member of the Town Council. If the 24 persons constituting the Dock Committee, under whose observation the wants of the commerce of Liverpool particularly come, are competent for their seats at that board, they are perfectly competent to consider that question. That Committee has been desirous, whenever suggestions were offered, to take them into consideration. If the negotiation which has been pending with Birkenhead should be carried out, the trades which it is proposed to provide for on the Liverpool side on the yellow land, could be provided for on the banks of the Birkenhead pool. I do not think that the scheme must be abandoned, if you bought Birkenhead to-morrow. I believe it takes a portion of that yellow land to make that canal marked to the eastward of the timber yards. If we were to abandon the whole of that yellow land, we should have, to a certain extent, to limit our canal, and I think it would be very disadvantageous indeed to do so. I never expressed an opinion as to the purchase of the Birkenhead Docks.

If the Birkenhead Docks should become the property of the Liverpool Dock Trustees, I have no doubt this scheme would be greatly modified. I do not think the negotiation as to Birkenhead has been publicly known more than three weeks or a month. I may be wrong to a week or two. This recommendation of the merchants was disregarded, because they were labouring under an impression that we were going further northward. If we had any occasion to extend the river wall, it would be an engineering question; but we did not consider it an engineering question, because we were not going further north, and as a scheme of docks we consider we are equally competent as merchants to judge of its propriety. It is only about three or four years ago that Modification of scheme on purchase of Birkenhead.

J. Smith, 27 Mar., 1855.

the Chamber of Commerce was established in Liverpool. I am not aware that there has been more than a very little difference of opinion with the Dock Committee. What they threw out originally was only a suggestion. They laid down the absolute necessity for more accommodation, and the only difference of opinion was as to taking engineering evidence. I do not know the circumstances under which this resolution of the Chamber of Commerce was come to. I am not in the Chamber of Commerce—I was not at that time, at least. We have the engineering advice of Mr. Jesse Hartley and his son, and I believe they are considered two of the most eminent men in this country on any question of dock accommodation. Mr. Hartley has been surveyor to the Dock Estate for a period of thirty years. There are a number of gentlemen in that chamber who reside in Cheshire, and I know that many of them have an impression that the carrying out this wall, which they were under the impression we were going to do, would affect the estuary of the river, and I think that their objection had great reference to that. I do not think, if they were here to answer for themselves, they would object to the dock plans at all. They objected to the wall which was built under the previous Act. It was explained to these gentlemen that the powers which were going to be sought did not affect the wall next the Mersey at all. After such explanation had been given, we did not hear any more of the objections of the Chamber of Commerce. Our surveyor has been in consultation with Sir William Cubitt from time to time during the last six or eight weeks.

John Fowler, 27 Mar., 1855.

Accommodation for Cunard steamers.

John Fowler, examined by Mr. Burke.

I am the Manager of the British North American Steam Packet Company, usually known by the name of Cunard's Line of Steamers; their managing director is Mr. Charles McIver. We have twenty-three steamers of from 1200 to 2600 tonnage. We work vessels to Havre and Constantinople, and are contemplating communicating also with Antwerp; our business has increased very considerably, and we contemplate a further increase. The length of the largest vessel we have now is 320 feet; we have one building which will be of the length of 400 feet; there is no doubt we shall build them larger still. The amount of dock accommodation we require is very considerable; we cannot discharge these vessels by laying them in tiers one against another; we require separate berths for each; we cannot discharge one over the other. We have an agreement with the Dock Committee by which we have the whole of the west side of the Huskisson Dock; that is not sufficient for our accommodation; we must have accommodation equal to the whole extent of that dock. When all our steam-ships come home from the Crimea, we shall want the whole of the Huskisson Dock. Nine of our vessels are now chartered by Government. At present the west side is not large enough for us; we occupy the whole of the sheds on the line of the quays in connexion with the docks. The

general steam trade at Liverpool has received an amazing impetus the last three years. The present dock accommodation is not at all adequate for that trade, extending as it is. If all the vessels were to come home now which are taken up by Government, we should represent about one-third; that would give you three-quarters of a million; our own would be 240,000 tons in a year, if they were all at home. The increasing the depth of the entrance to the proposed new docks is a very important element. Increased graving dock accommodation is absolutely necessary; for the Persia, for instance; there is no dock at Liverpool that will accommodate her, and if she was here to-morrow in a crippled state, we must send her to Southampton. We suffer inconvenience at the present moment from the shallowness of the entrance to the present docks, one voyage out of three at least.

J. Fowler, 27 Mar., 1855.

Insufficient size of docks and depths of sills.

The America, which is to sail on Saturday, came out of dock last Thursday, entirely owing to the want of water; there is not sufficient water over the sill of the existing dock to allow our vessels to go in and out at all times; in consequence of that they have to lie in the river. If an increased depth of eighteen inches or two feet be given to the sill of the new docks, it will remove one half of the inconvenience we now suffer.

Cross-examined by Mr. Serjeant Wrangham.

Cross-examination.

At present our steamers are sometimes unable to get into the Huskisson Dock; its sill is six feet below the datum; there is more water at that dock than at any other. We can get out of the Huskisson Dock with a two feet less tide than at the Coburg; I do not know at what level below the datum it is proposed to lay the sill of the projected docks; that is a professional question. We could always get admission if we had two feet more water; we could not get out always. On this, the 27th of March, we have a 9 feet 8 tide; that is one of the lowest neaps in the year; one of our ships can neither get out of the Huskisson Dock nor into it. But if you come up to the 31st of this month with a 14 feet 7 tide, and add 6 feet in the Huskisson Dock, you can get out. We took out our vessel upon the 22nd, with a full cargo of coal; if we had not had her out we could not have sent her to sea on the day we are advertised, that is the 31st; we could not have got her out of dock till two days after the time advertised for sending her to sea. She lay in the stream. I am not aware that we have ever had an instance of a vessel being kept in the stream in consequence of bad weather. Occasionally we have to discharge, also to load, in the stream. We require much more quay space than centre; if the Huskisson Dock had been half its width, so that we could have taken our steamers in at one end and out at the other, the dock would have been much more convenient for steam-vessels; it would have been able to do more work than it does at present. It has only an entrance at one end at present. I prefer an

Quayage essential for steamers.

J. Fowler, 27 Mar., 1855. oblong-shaped dock to a square dock; all we want in the middle is a passage sufficient for vessels to come in and out.

J. Farmworth, 27 Mar., 1855.

John Farmworth, examined by Mr. Webster.

I am a member of the firm of Farmworth and Jardine, concerned in importing timber; also shipowners. We have been engaged in the timber trade in Liverpool about twenty-seven years. The following is a table of the

AMOUNT of Tonnage, &c., employed in the Timber Trade annually for the last Thirty-three Years, from British America and the Baltic.

Years.	British America.		Baltic.		Total.		Average Tonnage of Ships.
	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.	
1822.....	336	99,493	121	27,708	457	127,201	278
1823.....	354	98,708	172	39,495	526	138,203	263
1824.....	425	123,176	184	37,927	609	161,103	265
1825.....	304	88,564	202	41,300	506	129,864	257
1826.....	326	101,231	112	37,618	438	128,849	294
1827.....	231	71,731	123	30,330	354	102,061	288
1828.....	281	86,017	106	27,272	387	113,289	293
1829.....	266	85,474	95	23,641	361	109,115	302
1830.....	321	106,392	66	18,166	387	124,558	322
1831.....	247	85,573	58	17,438	305	103,011	338
1832.....	328	113,474	96	26,799	424	140,273	331
1833.....	244	90,377	59	19,257	303	109,634	362
1834.....	335	117,505	93	27,398	428	144,903	339
1835.....	419	163,370	102	29,545	521	192,915	370
1836.....	329	144,604	66	18,900	395	163,504	414
1837.....	273	134,017	63	18,995	336	153,012	456
1838.....	305	160,415	72	22,788	377	183,203	486
1839.....	339	170,591	58	17,415	397	188,006	474
1840.....	230	133,400	48	14,000	278	147,400	530
1841.....	318	174,948	40	11,923	358	186,871	522
1842.....	165	91,179	33	11,239	198	102,418	512
1843.....	311	154,518	61	17,253	372	171,771	462
1844.....	369	189,414	51	14,144	420	203,558	485
1845.....	453	239,854	113	33,792	566	273,646	483
1846.....	461	254,799	137	33,759	598	279,558	461
1847.....	314	172,427	84	26,564	398	198,991	500
1848.....	316	190.186	81	26,606	397	216,792	546
1849.....	395	225,783	57	14,141	452	239,924	531
1850.....	360	208,987	43	11,768	403	220,755	548
1851.....	373	242,398	93	26,562	466	268,960	577
1852.....	382	253,951	61	18,820	443	272,771	616
1853.....	498	337,626	129	40.545	627	378,171	603
1854.....	421	311,109	69	19,569	490	330,678	675

In 1822 there were 457 ships; taking the two together the tonnage was 127,201; the average tonnage of the ships was 278. In 1854 the number of ships was 490, and the average tonnage is 675. There has been a very large increase of the size of the ships engaged in the timber trade.

Objections to south end for timber.

The accommodation at the south end is not sufficient for the trade; there are several special objections to it; in the first place, land to deposit timber on is all private property, and will be sold when they can get a fair price for it; then a great deal of the land is upon a hill, which is very inconvenient and expensive. The circumstance of its being private property and in the market renders the tenure very uncertain. We require certainty of possession to carry on our trade with advantage. I

was a member of the Committee of Inquiry in 1850. At that time I examined into the accommodation which could be furnished at Birkenhead, but we could not get sufficient information to enable us to decide that we ought to remove; we could not ascertain the expense, provided we did remove; we were told that they would offer for an unlimited period land at a certain price, but we wanted to ascertain at what rent we could have the land, and we could not ascertain that. We found that we should be subject there to the same kind of uncertainty as that of which we complained at the south end, and we gave up that inquiry as regards Birkenhead. We then directed our attention to the north shore. At that time there had been no arrangement with the Dock Committee about those plots of Lord Derby's land; the want of such an arrangement was an objection to that site, because when we came to look over the land we considered that the timber trade could not be accommodated there without those blocks of land. Having that opinion, we wrote to Lord Derby's agent to know upon what terms and at what rent, and for how long, he would let those blocks of land; we could not get any terms, and therefore we gave it up; we could not get any binding rates, or that certainty which we thought essential. If the Dock Committee should have this land and the present plan be carried out, the accommodation which we think we require will be afforded us.

J. Farnworth, 27 Mar., 1855.

Objections to Birkenhead.

Objections to north shore scheme of 1848.

My own private feelings and interest were in favour of the south end; I like it as a locality better than any other, but I have arrived at the conclusion that we cannot remain there, owing to the reasons already given and the increased size of the ships. Since I became connected with the timber trade, I find that the ships have increased from about 600 tons to 2300 tons, drawing 22 or 23 feet; the largest are to North America. At the south end we have not accommodation for ships of that size getting to the docks, nor have you the land accommodation for the storage we require. The increase of the size of the ships, in addition to the uncertainty of the tenure of the south end, and the inconvenient nature of the land at the back, has rendered this north shore scheme essential for the accommodation of the timber trade, in my opinion. It is a recommendation to the scheme that the storing ground will be in the hands of the Dock Trustees; I prefer its being in their hands to private owners. The advantage is this: if I am a private landowner, and let my land on a rent to the timber trade, I purchase the land for the purpose of selling and getting a profit; the Dock Committee purchase the land for the purpose of accommodating permanently the timber trade, and they will be able to do so at a rent which you can afford to pay; it is the cheapest land they can get. It will also be level, and in that respect superior to the south, and it will save a great deal of money in charges. There is considerable inconvenience from a division of the market. The necessity that the larger ships should go to the north end, to the Huskisson Dock, would lead to a division of the market unless the whole of the trade went there; such a

Objection to south end.

North shore scheme.

Advantage of land being in hands of Dock Committee.

J. Farnworth, 27 Mar., 1855.

division is an inconvenience and a loss. That division has an effect upon the price at which timber sells, to an extent of from 2½ to 5 per cent. in value; that is the difference of price between the north and the south end; that difference of price, and the loss consequent upon it, would be removed if we had the whole of the timber trade at the north.

Cross-examination.

Cross-examined by Mr. Calvert.

It is very probable that at the present moment there may be a larger quantity of timber at Liverpool than has ever been known. The ships with that timber are in the Brunswick and in the Huskisson Dock at the north end, and some small portion at Birkenhead. We could not have water and land-space sufficient for our trade, with the present size of our ships, at the south end and at Birkenhead. We wish the timber to be taken to the land and piled there without expense, and without its touching the water at all. If we had the accommodation of a float, and could take our ships into it and discharge the timber into the water, and lead rafts of that timber up to the dock side, that would be as economical a method of discharging our cargoes as we could possibly have. It would be more economical than landing it by heavy machinery out of the ship directly upon the dry land. If such a space could be afforded to us at the south end, it would give us the most economical mode of discharging our timber. There is no advantage to the timber trade from private individuals holding land at the south end; there is no competition there to let land. The competition is the other way,—to get hold of it. If, as proposed under this Bill, the Trustees were in possession, we should have to encounter the Dock Committee, and we presume they will be interested in giving us all the accommodation we can require at as low a rate as possible. If the Dock Committee buy this land at 19s. 6d. a yard, instead of 10s., we shall have to pay a higher rent; I do not say it will alter my view; I was in the majority at the public meeting, and decidedly in favour of the south end and against Mr. Smith.

No competition in storage at south end.

Re-examined by Mr. Webster.

I understood the question about competition at the south end to be, that landowners there would be very anxious to let their land to the timber merchants, and this competition on behalf of the landowners would cause the land to be reduced in value; it is not so, the competition is the other way. The timber merchants are anxious to get hold of the land; that is in consequence of there being an insufficient space for timber; that will be removed, in my opinion, by the quantity of land which it is now proposed to take, coming into the hands of the Dock Committee. I have no reason to doubt that we shall get the land from the Dock Committee at fair prices. The fact of the Committee having upon it so many merchants, and representing so many interests, is a security for that. Members of the timber trade are upon

the Dock Committee; there are Mr. Smith and Mr. Challoner. I have no doubt that the land will be better in their hands, both as regards price and certainty, than in the hands of private landowners. *J. Farnworth*, 27 Mar., 1855.

By the Committee.—I never heard any complaint of partiality to particular merchants. I said that, when the Committee went over to Birkenhead, we found we could not get a sufficient assurance that we should have a permanent tenure of land of a sufficient quantity and at a low rate; if we had that assurance, we should not prefer Birkenhead to the north shore. I do not think there is a member of our trade who would prefer Birkenhead. I cannot tell the Committee the proportion that our trade pays to the whole of the revenue of the Dock Trust. It is rather large, I think. It does not follow that our trade will not pay for the expense which they go to for us: I think we do pay sufficient for that purpose. North shore preferred to Birkenhead.

Wednesday, 28th March, 1855.

THE RIGHT HONOURABLE HENRY LABOUCHERE IN THE CHAIR.

James Holme, examined by Mr. Hope Scott. *James Holme*, 28 Mar., 1855.

I have been extensively engaged as a builder, and as a contractor for railway and other works. I was born and brought up in Liverpool. My attention has been much directed to the accommodation of shipping at Liverpool. I have held the opinion that the Liverpool Dock Trustees should do large things at once, or do nothing. In 1854, a scheme was propounded for the expenditure of 600,000*l.*; I was opposed to that plan, because I believed the time had arrived when we ought to undertake a large matter, and not go bit by bit, as we had been in the habit of doing, especially as to the acquisition of land. As a builder, I am familiar with the increase of the value which land in Liverpool has had within the last few years, particularly towards the north end. The construction of any public works will increase the value of the adjoining land, which thus deriving its value by the outlay of the public body, if a further increase of works is required, that body has to pay for the value which itself has given to the land. No work will, in my opinion, be constructed northwards of the proposed, unless it be a mere timber float. By adopting this plan, and getting the timber trade upon cheap property, it will enable us to deal with very valuable property at the south end, which is now almost useless in consequence of having that bulky article of timber laid upon it. The removal of the timber trade from the south end was agreed upon as the condition of our proceeding here. The timber trade did not consider that they had a proper accommodation upon the plans of 1848, as then proposed. I myself went Increased value of land for public works.

J. Hoine, 28 Mar., 1855.

down with a model of the proposed works, and waited upon a great number of the timber trade. Many, who had formerly opposed going to the north, said, if those accommodations could be carried out, they one and all agreed to go there: they wanted a large space and comparatively cheap accommodation, and easy means of transit into the interior. I have put down the timber going inland at two-thirds; but from the evidence I heard yesterday, I find that three-fourths goes inland. By the proposed plan, the timber merchants will have the requisite conveniences; and by having that canal at the back, they will have an advantage. During the busy time, when it is necessary to get a Quebec ship off to sea to save a winter voyage, by the plan now proposed there is a double frontage to the timber yards, and the large ships can be brought in the canal to the back of the yards, so giving a double frontage; and a vessel could discharge her deals, while another vessel at the front could discharge the bulk timber.

Trades in connexion with shipping.

Liverpool has suffered very considerably with regard to the general trades connected with shipping, inasmuch as by the great increase of the size of the vessels, we have only been able to accommodate that class of vessels at the north end; and we cannot deal with the general docks of the port till a definite arrangement is come to as regards the timber trade. Vessels requiring machinery have it all carted through the streets at great inconvenience. With the proposed plan of docks, and the yards adjoining, I anticipate that engineers, boiler-makers, and others concerned in the repair and fitting of ships, will be immediately upon the spot where the work is to be done; the workmen would be concentrated, and that would be a great saving to the masters and to the public, and space would be saved in the other docks. The Sandon Dock now is occupied by vessels; it may be called a sort of hospital dock; it is occupied by vessels wanting machinery, or vessels wanting to go into the graving docks. The removal of the timber trade will facilitate our operations in the existing docks in the way of improvement. If we take out the land between the Coburg and the Union Dock, we could put wide entrances into the Brunswick Dock. It is also proposed to widen the gates of the Queen's Dock, and deepen it. As soon as we have removed the timber trade, we can make use of the Harrington land, as to which the Dock Committee are suffering a great deal of loss, and the trade too. It is proposed to take powers to borrow four millions under this Bill. From my knowledge of the way in which the works have been conducted at Liverpool, I do not anticipate that it will be raised and spent rapidly. The Dock Committee would be able to regulate the expenditure of money, according to the increase or diminution in the trade of the port. We cannot proceed with docks as rapidly as a railway; the men are concentrated into a small compass. I do not suppose we could spend above 300,000*l.* a year, nor have we ever done so on dock works. We could not go on building warehouses till other arrangements are made. We must dis-

Rate of progress of works.

embarrass the existing quays, and widen the eastern streets: the whole is a gradually progressive scheme. The widening the eastern streets is intended to be provided for by the Bill of the Corporation, the docks repaying the Corporation for the land occupied by warehouses. The investment of money in warehouses is very wise and judicious, inasmuch as the Dock Trustees have nothing to pay for the land on which the warehouses are erected; private warehouses are at the disadvantage of a large expenditure for land as a ground rent. I cannot say so much as to the Albert Dock warehouses having paid well; they were peculiarly built, upon very bad foundations; but as to all the warehouses which will be now erected on the east quays of the docks they will be on good solid foundations, and may be made to pay very well. *J. Hobne,* 28 Mar., 1855.

If Birkenhead were added to the Liverpool Dock Trust to-morrow, it might be some reason for dispensing with the yellow land; but independently of purchasing the yellow land, the trade of the port would demand the carrying out of the whole of that plan, except the yellow land. At the same time the yellow land would be in the position that other land is; that is, of acquiring very considerable additional value from the works of the Dock Committee; and on the supposition that hereafter there would be an extension there, we should be in the condition of purchasing that upon exorbitant terms, and not giving that secure accommodation to the trades of the port which in my judgment they so greatly require.

Cross-examined by Mr. Calvert. *Cross-examination.*

I am not an architect, I am a builder; I have been a builder and contractor all my life. I have not had any other business besides that. I have had a great deal to do with the timber trade. My business has been transferred to my brothers, who are now builders and contractors at Liverpool; my property is in many places in Liverpool, but our business yard is in Renshaw-street, very near the Adelphi Hotel. I have property in the vicinity of the docks, both at the south and at the north end. I have had as much to do with the scheme which is under the consideration of the Committee as others; I think the merit of suggesting the plan is due to Mr. John Hartley, in a great measure; "in the multitude of counsellors there is wisdom" sometimes, and we put our heads together. I said the time had arrived for doing large things; I will confine myself to the timber trade; if we attempted to put a spade in the Harrington Dock ground, we had the timber trade up in arms immediately. We have no land lying at the back of the timber quays now, it is in the hands of individuals, and I know that one of the timber merchants himself sold a piece of land not long ago, although contending that it was requisite for the timber, at about 30s. a yard. The consequence is that the timber trade has no certainty whatever of tenure, and I think that it highly becomes the Dock Trustees of Liverpool

J. Holme, 28 Mar., 1855.

to provide for it, or they must see it driven away from the port or transferred to Birkenhead. I am deeply interested in Birkenhead also. If these works are not undertaken by the Liverpool Trustees, the timber trade will go to Birkenhead. I do not see anything else for it. The reason I wish to undertake it is, that we may place that trade at Liverpool in the cheapest and best position of any place in the country, if we take advantage of the facilities for it; cheaper than at Birkenhead. It is because the accommodation at the north shore would be cheaper and better than at Birkenhead that I am in favour of this scheme. I believe without cheapness we shall not be able to compete with Hull and other ports. I do not know what you mean by 19s. 6d. a yard; if you take the timber trade *per se*, and separate the works which are there proposed for the timber trade, that trade can be put down there, with docks and all complete, at an average of something like 17s. 6d. a yard. I take all the space except the large lock, which is 100 feet—the lock going out of this basin, which I say belongs to the steam trade and not to the timber trade. I exclude from my calculation a large lock which runs from the basin into No. 2 Dock, which would give access for steamers into the Huskisson Dock. I do not include the land to the east of the Derby road, because that depends upon whether we agree with the canal or not. I include everything else. We propose to devote the whole of that to the timber trade, to boiler-makers, and engineers of that class. That is the cost at which we propose to obtain the entire accommodation for the timber trade, so as to remove it from all the other parts of Liverpool. I am acquainted with the entire plan of those who are bringing forward this Bill. Some of the land is marked for ship-building purposes; the ship-builders may or may not go there, as opportunity serves. If they choose to go there, there is accommodation for them. There is plenty without that for the timber trade, unless a great increase takes place.

Cheapness essential for the timber trade.

I am a member of the Dock Committee, elected by the Council, and not by the ratepayers. In some remarks, on the 4th of August, 1854, I said that the expense would be 20s. a square yard, we have now got into more exact estimates; I take my estimates from our surveyor, who is generally found correct, and rather over than under. Unless we do something with the timber trade we cannot deal with the docks generally, and make all the needful improvements, such as widening the gates and deepening the sills. The time has arrived that the circumstances of the timber trade should be settled, and these circumstances being settled, we shall be able to dispose of the arrangements of the docks more satisfactorily. The outlay upon any of that ground increases the value of the adjoining ground; that is, if we lay out money upon the pink we shall increase the value of the yellow, and so on; and if we lay out money upon the yellow we shall increase the value of the land adjoining to that. The reason of our getting possession of the yellow land is this: there is a feeling that we have had no proper accommodation for the trades of the port, which I contend have as good

Increase in value of adjacent land.

a right to be accommodated as the merchants of Liverpool, and the Dock Trustees having no pecuniary interest, would be able to afford cheap accommodation for engineers and other trades, and so prevent their going to the Clyde for the want of proper accommodation. It may be advantageous for the Dock Trustees to get possession of ground there for smelting. It would not be a good thing for them to have ground for cotton factories. I include trades connected with shipping only; and when I say that the yellow land can be made available for engineers, and instead of our docks being encumbered as they are now with steamers wanting machinery, by our getting possession of the yellow land we could take a steamer into that canal, and she could have anything done to her connected with shipping, instead of our docks being encumbered,—I speak of those trades which apply to the shipping interest only. We do not wish to have butchers' and bakers' shops there; those will go behind, upon land we do not wish to meddle with. I have met some American captains at the hotel since I have been in London. I consulted them as to what they thought of the plan of the north docks; they said there was some difficulty in docking, it was an exposed place; but I went myself last Sunday week, and saw the largest steamer which I believe is in the kingdom docked when it was blowing a hard gale of wind. I had some conversation with an American captain last night upon the general arrangements we are about to make. I think he was much more satisfied. At first he stated that he did not like to have to dock his ship upon the north shore. There were three or four of those captains there who told me this.

J. Holme, 28 Mar., 1855.

Cross-examined by Mr. Pickering.

Cross-examination.

The canal will be two hundred feet wide, and will take vessels drawing twenty feet if they can get into the main entrances. If the Liverpool and Birkenhead Trusts were united, I think we should have to buy some small portion of the yellow ground to enable us to get a quay along that land. In addition to the canal itself, we shall require about the width of a street, I think. Under the Act of 1848 an agreement with Lord Derby was entered into, by which the Dock Trustees were bound to extend the Regent road a considerable way northward. I am aware that a large portion of that road ought to have been already completed; the value of the yellow land is materially affected by the existence or non-existence of that road. Assuming that Liverpool and Birkenhead were united, we should purchase only a portion of the yellow land; the value of the remainder would be materially improved. So far as my individual opinion is concerned, if we become the purchasers of Birkenhead we should give up so much of our scheme as includes the formation of foundries and smelting works, because they could get that accommodation at Birkenhead. We have some smelting works upon the Harrington Dock land. I do not know what they are exactly, but they

J. Holme, 28 Mar., 1855.

are connected with the working of copper ore; we have no foundry works. It is no part of our present scheme, assuming we do not go to Birkenhead, that the Liverpool Dock Trustees should become traders in those respects. We propose by this Bill to keep our powers over the purchase of this land for seven years. It would be prejudicial to us to bind ourselves as to any portion of that land, to exercise our option of purchase within a shorter period than seven years. I would rather not do so.

Re-examined by Mr. Hope Scott.

There were four American captains at the hotel; we happened to be there staying together, and a good deal of conversation took place one morning; they may be coming as witnesses for the Birkenhead interest. They said that the docking at the north end was exposed; the party who spoke on the subject had always been in the habit of going into the Waterloo Dock; I had no statement from them of their having used the existing north docks to a disadvantage. In speaking of trades connected with shipping, I include ore smelting, because it is one of the first steps towards plates. We limit ourselves to those trades which are necessarily connected with the actual rigging and making of ships and the machinery.

The land which is marked blue was in exchange for making the four blocks of land coloured pink; we have since made conditional arrangements with Lord Derby for the purchase of that land; that 90,000*l.* dispersed over the whole makes the average of blue and pink taken together 1s. 5¼d. per yard; I have not included in that any part of the yellow. The works cost 809,000*l.* exclusive of the long lock I spoke of before; that I consider belongs to the large class of steamers, and is not immediately attached to the timber trade; we have already expended upon these north docks 152,000*l.* Then there is land from Lord Derby 90,000*l.*; and a portion of the yellow land with buildings upon it is taken at 366,000*l.*; we then get a total area of 1,636,219 yards of land at a cost of 1,417,000*l.*, which will average about 17s. 6d. a yard when the works are finished; this estimate is taken from Mr. John Hartley; it will not agree with the general statement he will make, inasmuch as I have appropriated the portion attached to the timber trade.

Details of cost of accommodation.

I found my calculation upon the way in which this property will repay the Dock Estate, by a revenue from the timber trade only. The interest upon that outlay at 5 per cent. is 70,850*l.* Now we shall have on the east quays of the dock space for storing timber 266,000 yards, which at 9d. a yard is 9975*l.* a year. We shall have at the back 386,139 yards; I put those down at 1s., and when I tell you that we are now receiving 1s. 6d. and 2s. a yard from the land situated at the back of the Stanley yard, I do not think I am assuming a high value, this makes 29,221*l.*; 88½ acres of water-space I assume to produce only 37,740*l.*, the same as the Brunswick Dock did last year. Thus, if we succeed only in taking

Return for outlay.

the timber trade from there to the north end, and the trade produces the same amount as it did last year, that is, 37,740*l.*, we shall only be minus 3889*l.* per annum, for 88½ acres of water-space, versus 12½ acres at the south, and I think that is putting it in the most unfavourable position. Cheapness is a necessary element for the timber trade, and I believe it can be done more cheaply and more efficiently at the proposed new north docks, than at Birkenhead, even if it were bought to-morrow. I am a large shareholder in the Birkenhead Dock and Warehouse Company. If the timber trade goes to Birkenhead, as it must go if it is not accommodated at the north end, it would go to the Dock Company's land. *J. Holme,* 28 Mar., 1855.

[*By the Committee.*—The timber trade in Liverpool is in a good many hands there, both timber merchants and timber importers; many timber merchants are now timber importers also, many of them deal in timber very largely. The proposed scheme, as far as relates to the accommodation of the timber trade, has been fully laid before the timber trade at Liverpool, and discussed by them. I myself called a meeting of the trade, and had the matter fully discussed, and any alterations they suggested were taken into consideration. I believe the timber trade, generally speaking, to be satisfied that those alterations will be for their advantage; there may be one or two individuals, but the principal part of the timber merchants are all satisfied. That has not appeared in any formal manner; I think they would do so if they were called together. They have no recognised organ, they have no Chamber of Commerce or any body representing them. They have had no meetings upon the subject that I am aware of, except the one that I called; I think they have acquiesced; they have stated that if they could get that accommodation they would have no objection to go to the north. The meeting to which I refer was held some time last year—it was while we were in the sub-committee preparing these plans; it was held at Mr. Steel's office, and if I recollect rightly it was about last July; I will not speak confidently to the time. There were from twelve to fifteen of the principal timber merchants present. The timber trade were aware that the meeting was going to be held; I promised to bring them a model. If any of the timber merchants choose to stay at the south end they may have an opportunity of discharging ships the same as they have now, but I believe the facilities will be so great at the north end that not one of them who considered his own interest would remain there. The expense at the south end would be considerably greater. I think Birkenhead more valuable for purposes such as I have mentioned for the yellow land, than for the timber trade. At present there are two bodies at Birkenhead; the one called the Dock Trustees, and the other the Dock and Warehouse Company; unless those two are amalgamated, and parties can bring a ship and make use of the float and have the vessels brought up to the ends of the yards, I think there would be a sort of collision; but if those two were amalgamated, then the parties would take

Meeting with members of timber trade.

Birkenhead suited for special trades.

J. Holme, 28 Mar., 1855.

the land on the borders of the pool, for purposes similar to those we are proposing for that yellow, and so make it very valuable. If an arrangement were come to with Birkenhead, we possibly might not want the yellow land. That does not apply to that portion of the yellow land which is on Mr. Lee's estate, to the east of the Sandon Docks; that will all be required for steam navigation. I cannot tell you what is the revenue from timber to our Trust exactly. In the Brunswick Dock, where there is a portion of the general trade, but the great mass consists of the timber trade, 12½ acres last year produced 37,000*l.* I do not agree with the statement of Mr. Barber "that the whole of the revenue derived from British America, and the Baltic, and other places where they get timber from, was 42,000*l.* per annum, and out of that they must deduct a great portion of it, hemp, tallow, flour, and other trades, leaving little derivable from the timber trade." I could confute it by going through a number of details which I have not here.]

Land belonging to Corporation.

The Corporation has very little land connected with the docks. The Dock Trustees have land at the Harrington Dock. The Corporation has land on the Birkenhead side, but not the Dock Estate. It has been the practice for the Corporation to sell land to the Dock Trustees. The Corporation have a reversion in a large portion of the land upon which the present Birkenhead Docks stand; there is an unexpired lease of 70 years. The Corporation has a considerable extent of land besides, upon the opposite side of Wallasey Pool. We have never instructed our engineer to ascertain whether docks at a much less cost could not have been made there for the convenience of the port and the timber trade; I believe thet imber trade cannot be accommodated at anything like the price elsewhere. We have had no report upon the subject, but we know pretty well as to the price which is asked at Birkenhead, and which would enable us to form a calculation. The Crown held a considerable portion on the Cheshire side, but has made some arrangement with Mr. John Abel Smith. In this instance we have looked out for a cheap place for the timber trade, which can only be carried on with great economy, and for the place which will best accommodate the timber trade; I consider that the Liverpool side of the Mersey will accommodate it with more convenience than the Cheshire side. The Birkenhead land would be leasehold, but if an arrangement was made for a purchase, the probability is, it would be made freehold. The pink land was made at a very light expense, inasmuch as we have been excavating the Wapping Dock, and if we had not the pink land to have put the excavation on, we must have carried it elsewhere.

W. Mann 28 Mar., 1855.

William Mann, examined by Mr. Webster.

Approval of Shipowners' Association.

I am a merchant and shipowner at Liverpool, and a member of the Corporation and of the Dock Committee, and chairman of the Shipowners' Association; that is a considerable body at Liverpool, having connected with it between 130 and 140 firms at Liverpool, representing

I should calculate, decidedly more than one half of the shipping which comes to the port. The Shipowners' Association have had the plan of the Dock Trustees under their consideration, and expressed a favourable opinion upon it as embodied in resolutions of the 5th September, 1854; I was in the chair upon that occasion. The resolutions are as follow : *W. Mann, 28 Mar., 1855.*

"The following resolutions which had been submitted to a meeting of the association on the 1st instant, and which meeting was adjourned to this day, in order that in the mean time the resolutions might be transmitted to all the members of the association, and the secretary having stated that they had been so transmitted by him, the same were now further considered and unanimously approved of and passed, viz., That this association is of opinion that the very great and rapidly increasing commerce of the port imperatively calls for a large and early increase of dock space and accommodation. That the association has considered the scheme of dock extension now proposed by the Dock Committee, and approved of by a large majority of that body; and reserving to itself all opportunities of offering hereafter suggestions as to matters of detail, is of opinion that the scheme is well calculated to afford the space and accommodation required. And it was further resolved, That this association entirely concurs in the opinion of the special sub-committee of the Dock Committee in their recent report, that as the town is as much, if not more beneficially interested, than the docks in the improvement of the line of the strand communication, from north to south, the expense, as far as it relates to property beyond the dock boundary, should be borne by the town; and this association considers that as the relative expense of making dock space is so much greater in the centre of the dock line than at the extremities, it is impossible for the Dock Committee to give such increased accommodation, admitted on all hands to be the most convenient and advantageous for the trade of the town, without such assistance." Resolutions of Shipowners' Association.

That last resolution refers to the town improvements, which have been carried on at the expense of the town. I concur in the opinions contained in the resolutions, that it is necessary that the Dock Trustees should have a comprehensive plan; the present condition of the shipping interest, and the rapid rate at which it is increasing, is considered to require such a plan.

Cross-examined by Mr. Calvert. *Cross-examination.*

There was considerable discussion at that meeting with reference to these plans, and the different parts of them, as affecting different parts of the Liverpool Docks. I have no doubt the capabilities of Birkenhead were mentioned; I cannot say by whom.

Cross-examined by Mr. Gregory. *Cross-examination.*

I reside on the Cheshire side of the River Mersey, near the mouth of

W. Mann, 28 Mar., 1855. Encroachment on Cheshire shore.

the estuary. I have observed the effect of the tide upon the portion of the river where I reside. There have been very considerable encroachments going on upon the shore between Seacombe Point, and what is called Sea Bank, about half way down. My impression is, that this encroachment has gone on precisely as the new north dock works have gone on; I think it commenced with those works at the new north docks, and has progressed with those works. I have no hesitation in saying that it has been the effect of those works; that they have driven the tide across the river, which has caused a washing away of our shore. It must necessarily have a considerable effect upon the navigation of the river; by carrying out a great deal of silt which is deposited; there is a large portion washed away from that shore. I do not pretend to say where it is deposited. A river wall would be the remedy for that. I have always thought that in addition to the benefit to the shore, it would be a benefit to the navigation of the river.

Re-examined by Mr. Webster.

I include in the term new north docks what was done under the Act of 1848; that is the river wall. Birkenhead is well known to a great number of the members of our body. What has been going on there, and the capabilities of Birkenhead, are matters which most of our shipowners, or all of them, are well acquainted with.

Management of Liverpool Docks generally satisfactory.

By the Committee.—I am of opinion that the management of the docks at Liverpool has, speaking generally, been satisfactory to the trade. The increase in the trade in Liverpool has been so rapid, especially of late years, that the Dock Committee have found it difficult to meet the requirements of the trade, and consequently there have been occasions when there have been complaints. Hitherto the progress of the trade of Liverpool has outstripped the calculations of the Dock Trustees in everything connected with the town. I am a member of the Council, and sent by the Council to the Dock Committee. I have been a member, with perhaps the exception of two years, for the last ten years. If there were any amalgamation with Birkenhead, I should say, judging from past experience, that it would still be desirable for the whole of this plan to be carried out; at any rate, it would be the safer course for the Dock Committee to secure the land that it is proposed to buy. Hitherto experience has shown that those who manage the docks at Liverpool have reason to regret not having looked forward to the increased value of land from the works they have constructed. I remember one of the most intelligent merchants of Liverpool, who was himself a member of the Dock Estate of that day, saying when the Prince's Dock was built, Liverpool would never require any other place to sail a yacht in,—it would never be without a place to sail a yacht in,—that is, the trade of Liverpool would never occupy all the dock space which then existed. I may observe that the Prince's Dock is rather further to the south than midway now.

William Imrie, examined by Mr. Webster.

W. Imrie, 28 Mar., 1855.

I am a ship-broker in Liverpool, as a principal 25 years, and as connected with shipping about 35 years. I have had almost daily facilities for becoming acquainted with the management and the requirements of ships. The present limited space for tonnage entering the port of Liverpool has compelled the Dock Committee to adopt certain rules, which are very detrimental to the loading of ships. Vessels arriving from sea are obliged to dock in rotation as they come in, as the draught of water will allow them to do as long as there is room. When the docks are occupied sufficiently according to the estimation of the authorities, a flag is hoisted, preventing more vessels entering that dock. The arrival and departure of ships is dependent upon the winds; in the case of a long prevalence of easterly winds the docks get considerably thinned down, because ships get out but do not arrive; upon a change of wind we have a considerable arrival. Within the last fortnight, the arrivals owing to a change of wind were so numerous, that the entire of the docks in Liverpool were quite full, and many ships had to remain in the river for days. During a considerable portion of the year, say for nine months, we have vessels arriving in such a manner that the pressure upon the docks is very considerable. The detention of ships in the river is due to the want of accommodation, and also to the want of water. A ship detained in the river has her crew on pay during the time she is lying there, and she has a pilot, and of course provisions. The pilot, generally speaking, is on board until she gets into dock; we have till the vessel gets into dock the expense of the crew and the pilot; we have had vessels detained a week in the river. The vessel remains at the berth till she is discharged, and is then turned out immediately and sent into the middle of the dock till it becomes possible to give her a berth for loading outwards. The regulation of the Dock Committee requires two-thirds of the cargo to be entered before a vessel is allowed to be returned as being entitled to a berth. Both as regards getting to a berth for discharging and for loading, we are obliged to be subjected to these regulations, resulting from the necessity of treating all persons alike. We are allowed, according to the tonnage of ships, a certain number of days for loading outwards, for 200 tons we are allowed 12 days for loading; for 300 tons, 14 days; for 400 tons, 16 days; for 500 tons, 18 days; and upwards, 21 days. That is the rule which the Dock Committee have been obliged to resort to from the circumstances in which they are placed. If a vessel does not load within that number of days she is turned out when the time expires; she is turned out in the middle of the dock, and the practice is then to re-book for another berth. The regulation on re-booking is precisely the same as to priority of berthing. The being turned out into the middle of the dock and re-booking is attended with expense. I have known vessels which have been turned out a third

Necessary but detrimental regulations.

Expenses of detention in the river.

Time for loading and discharging.

Re-booking.

W. Imrie, 28 Mar., 1855.

time. Generally speaking, vessels get loaded the second time, but there are cases in which they are turned out for a third time, and even that is not sufficient for loading the ships, but they are rare occurrences. I have had my attention called to the proposed scheme of the Dock Trustees, and have seen the plans. The removal of the timber trade from the south end of the town will give for the trade of the port very considerable advantages. The Dock Trustees will then have at their disposal the Harrington Dock and other docks at the south end, by which they can accommodate the general trade. It will enable the Dock Committee to afford the general trade a greater accommodation than we possess at present.

Cross-examination.

Cross-examined by Mr. Calvert.

I think the plan will go far to remedy the evils of which I complain. I do not think docks can be made sufficiently quick to meet the demands of the port; the increase of the trade of the port appears to me to be very great, and has been going on for the last twenty years—for more than twenty years; we have to take charge of vessels engaged in the coasting trade and to pay the Duke of Bridgewater's trustees dockage, besides that which we paid to the Dock Estate to procure accommodation, and from that time we have had only difficulty throughout, and the docks have not been made sufficiently quick to meet the exigencies of the port.

Duke of Bridgewater's Dock.

The payment to the Duke of Bridgewater is about 2*l.* a voyage; it is private property. The duke's trustees have nothing to do with it, and we could not get on unless we paid them that rate. The Duke of Bridgewater's trustees are the proprietors of the Duke's Dock; we wished to get into that dock, but till we paid the money we could not get admission. It is between Salthouse and King's Dock. If we do not use that dock we do not pay anything to the Duke of Bridgewater; if we use the Duke of Bridgewater's Dock, we have two payments to make, one to the trustees of the docks, and one to the Duke of Bridgewater's trustees. New docks have not been made quick enough; that want has been felt all along for twenty years. I consider the docks to be fairly worked at present, and I do not know of any improved plan, with all the rules, customs, and regulations we are obliged to submit to, which would improve it. The use of hydraulic cranes enables them to load and unload ships with much greater rapidity than without them. Dock space with hydraulic cranes can be turned to greater advantage for shipowners than without them, provided the warehousing is carried on under the same roof; if the goods had to be taken away there would be no necessity for hydraulic cranes, because the goods could not be carted away so quickly as they could be unloaded. If proper warehouse accommodation is afforded immediately adjoining the quay, and a hydraulic crane is used, the dock space in the vicinity would be much more useful and available for a greater number of ships than without that accommo-

dation. We have never had anything to do at the Birkenhead Docks, and have no interest in those docks. I recollect the arrival of the Lightning clipper; I do not recollect whether she was delayed for thirteen days; if she drew very much water, and at the same time the docks were full, it might occur. Vessels of a very heavy draught of water can only get in at spring tides. Ships have increased so much faster than the docks in size there is great difficulty now in getting them in; the docks were not constructed for vessels of anything like the draught that are now built. We want more water over the sills of the Liverpool Docks. Considerable inconvenience is produced by the accumulation of sand and silt upon the Liverpool side. There is difficulty in getting a vessel to sea in a strong north-west wind, but with the advantage of steam tugs that difficulty is very much overcome. The expense is from 2*l.* to 5*l.*, according to the size of the ship; a ship of 2000 tons might be tugged into the river for 5*l.* A very large proportion of the trade in Liverpool is done in ships drawing above 20 feet. There is a statement of the entrances into the port, but I do not think that would give the distinction. The inconvenience is caused entirely by the increase of the trade, and the increase in the size of the ships, and the want of water upon the sills. During the process of discharging the cargo some ballast has to be put into the vessel before she can finally discharge; the moment the last package of goods is landed, the dock master sends his men to turn the ship into the middle of the dock; he orders her out, the owner pays the people for moving her. Supposing the cargo is ready which is to be exported when she is at the berth where she has discharged her cargo, she cannot remain to put that cargo on board; she must go into the middle of the dock and then take her turn. She comes a second time to a berth by turn; having expended her first time, she goes into the middle of the dock and then she comes back again, either to that or some other berth; she is allowed to stay in that second berth according to her tonnage; supposing she is 200 tons, eight days. If the cargo is ready, it frequently happens that the loading the ship is done in that time; there are many cases in which it is not, as when the cargo is not ready. Then she goes into the middle of the dock again and has to wait her turn a second or third time. The first loading time is 12 working days for under 200 tons, from 200 to 300, 14 days, 300 to 400 tons, 16 days, 400 to 500 tons, 18 days, and upwards of 500 tons, 21 days; that is ample time if the cargo is ready.

W. Imrie, 28 Mar., 1855.

Delay to vessels of heavy draught.

Want of water on the sills.

Time of loading turn.

Re-examined by Mr. Webster.

There is great delay from the crowded state of the docks in getting to a loading berth, and if there should be a necessity for re-booking, that occasions considerable further delay. The delay and loss consequent upon this crowded state of the docks, are felt in various ways. The first operation in the shipment of goods is of course their arrival from the interior, from the manufacturing districts; they are sent by railway

W. Imrie, 28 Mar., 1855.

many of them, and many of them by water carriage. The railway companies have recently put upon their freight-notes, that if the goods are not removed in three days after arrival, a demurrage will be charged; the goods arrive for the vessel; she is in the middle of the dock and they cannot be shipped, and therefore the exporter of the goods has to pay that demurrage. The next operation probably is, that the principal may want his bills of lading of those goods lying at the railway. He telegraphs to say that he wishes his bills of lading that day; that cannot be complied with, because the vessel is in the middle of the dock, without any peculiar neglect as regards having the cargo ready. The want of accommodation is such, that, having regard to the ordinary course of trade, ships are subject to re-book a second and sometimes a third time. A vessel now loading was so long in getting to her berth, that the goods had accumulated at the railway or by the water carriers, and were sent in such quantities, that we could scarcely find dock room for them. The larger class of vessels are generally taken to the pier-head by steamers. The hydraulic cranes are only used where there are warehouses, not in the open docks. The docks are as fairly worked as under the circumstances they can be. As regards the rules with respect to discharging berths, and the rules about re-booking, the Dock Committee could not do more under all the circumstances than they do. During all the time that I have known Liverpool, I have always found the dock accommodation in arrear of the wants of the trade; I think it is still getting worse.

Delays from want of quay room.

By the Committee.—A vessel discharging or loading in the stream, and then going into the Birkenhead Docks, pays dues to the Liverpool Dock Trustees. Dues are paid to the Dock Trustees for vessels which enter the Duke of Bridgewater's Dock; all vessels reported at the Custom House pay dock dues, whether they discharge in the stream or not. A very considerable proportion of the imports into Liverpool are on Manchester account. With the view of obviating that loss and inconvenience, the people of Manchester are as much interested in promoting this Dock Bill as the people of Liverpool. With respect to goods coming by railway and subject to demurrage, it falls upon the proprietors of the goods. I am not prepared to say that no other scheme of accommodation which would serve the merchants of Manchester could be brought before the Committee; all I wish to convey is that we want more accommodation. I am not in a position to say whether this is the only mode in which that accommodation could be obtained. I should certainly prefer not going to Birkenhead; I have declined overtures to go there, and advantageous ones too; I do not consider that it holds out all the essential features required for merchants. The accommodation at Birkenhead, for the trade to which I allude, is complete, that is for the mahogany trade. Small vessels use the Duke's Dock; we paid for coasting vessels wishing for despatch, rather than have the vessels detained, so much money to have permission to go

Dues levied on all vessels.

there; it is used entirely by their own craft; it is a favour to get in. The 5*l.* spoken of as the expense incurred in towing a vessel out of the dock, does not include towing down the river; we pay that in the case of a vessel going from one dock to another; it would include towing some little distance. Steam tugs are very generally used for towing out of the docks. *W. Imrie,* 28 Mar., 1855.

Lieut. Charles Coatsworth, R.N., examined by Mr. Webster. *Lieut. C. Coatsworth, R.N.,* 28 Mar., 1855.

I am a shipbroker at Liverpool, engaged in that business for 25 years. I am also a lieutenant in Her Majesty's Navy. The docks and the accommodation for shipping, during nine months in the year, are in a very crowded state. After easterly winds the docks get thinned. Easterly winds may be taken to prevail three months in the year; as regards the other nine months, we are in the crowded state that has been described; during these nine months, there is frequently considerable delay in getting into dock. I have known ships delayed ten days in the class of ships that I am concerned with; that is owing to the crowded state of the docks; with heavy ships it is owing to the state of the tide. My business relates chiefly to the smaller class of ships, as to which there is delay, simply from the crowded state of the docks. When a vessel gets into dock, there is a further delay in getting a berth, varying from two to five days. Till a vessel has got into dock, we are subject to the expenses of both the crew and the pilot, and to still greater danger arising from collision in the river. The river is so crowded, and the traffic upon it so considerable, that that danger of collision is a serious one. The time that we can stop at the quay for loading is regulated by a certain number of days, after which limited time we are turned out into the middle of the dock, and then have to re-book. It has frequently happened to our ships to have to re-book more than once, as often as a third time, on some occasions. My attention has been directed to the scheme of the Dock Trustees, merely as regards the necessity of extension without going into the details. If, by reason of this measure, the Dock Trustees should be enabled to employ the southern dock for general purposes, and remove the timber trade to the north, that would be a very great accommodation to the trade of the port.

Delay from crowding and want of water.

Expense and danger in the river.

Re-booking.

Cross-examined by Mr. Calvert. *Cross-examination.*

The winds at Liverpool, in which we find the greatest inconvenience, come from the west and the north-west; these prevail a great deal towards the fall of the year, and almost all through the winter. The pilot expenses go on, the pilot remaining on board till the vessel is in dock. It is of importance that he should remain on board while the ship is in the river; the ship is never in such a state of safety, riding in the river, as to justify parting with the pilot. Collisions frequently occur; the ships come up with the flood, and anchor near the entrance of the dock; they sometimes come up against the ebb-tide, if the wind

Lieut. C. Coatsworth, R.N., 28 Mar., 1855.

is fair, and wait till nearly high water, depending upon their draught; frequently they do not get in that tide. It would be of very great importance to us to have access to some dock where we could have shelter, and where we could always get in every day in the year, and get rid of the pilot expenses, if such a thing could be, but I doubt it much.

Difficulty of docking at north and south.

It is more difficult, I dare say, to dock at the north end than at the south, but there would not be an amount of difficulty to afford a serious element in the consideration of making the docks, considering that we have steam appliances—that is, any practical difficulties which ought to weigh seriously in considering the propriety of this scheme, or any sufficiently great to operate against our having the increased accommodation that we want for the general trade of the port. Taking the question *per se*, I don't think there would be any appreciable danger or difficulty in docking vessels in that situation. The cargoes which come to Liverpool are of a very general nature. I would much rather they should come to Liverpool than to Birkenhead, because I should have them under my own eye, and under my own management.

J. Mondell, 28 Mar., 1855.

Joseph Mondell, examined by Mr. Burke.

I am a merchant at Liverpool, and an extensive shipowner. I work my own ships without the intervention of a broker, almost invariably. I heard the evidence given by the last two witnesses as to the want of further dock accommodation at Liverpool, and I concur in the opinions they have expressed. It is essential for the purposes of the trade that a vessel, upon her arrival, should find dock room. My vessels are frequently subject to delays, and to consequent inconvenience and expense, altogether attributable to the want of sufficient dock accommodation at this moment at Liverpool. The general trade would be relieved if the timber trade were taken to the north, as is contemplated. We should then have greater available space for the conduct of the general trade. There are now vessels loading in Liverpool, the third ships from the quay, and I have occasionally loaded a fourth. I am not certain that it is an inconvenience peculiar to Liverpool; there may be places in the kingdom where a similar circumstance occurs, but it is a very common occurrence in Liverpool. I am sorry to say it is a source of great inconvenience, and sometimes of very serious loss. The Committee will easily understand the extra labour of transporting goods across two ships to load a third. Sometimes loss occurs in this way—if two ships are loading similar goods, the goods will sometimes get on board one ship which are intended for the other. I have to pay for goods which should have been landed in Venezuela, and found them in Valparaiso afterwards. There is a loss from the rolling of large packages over those ships; it breaks them very much. It is essential for each vessel to have its separate berth, in order to carry on the trade successfully. The trade of Liverpool has increased very much, both in the

Vessels loading over each other.

Loss and inconvenience.

number and in the size of the vessels. Looking to this circumstance, it is expedient for the Trustees to take a very large area for the future accommodation of the trade; it was mere drivelling what they did before. It is most desirable that the Trustees should take an enlarged view of the necessities of the trade, and provide for them. All past experience tells us that it is absolutely necessary. *J. Mondell*, 28 Mar., 1855.

[*By the Committee.*—I am a member of the Pilot Committee of Liverpool, and also one of the Audit Commissioners of the accounts of the Dock Estate.]

I have nothing to do with the management of the Dock Estate. If it was thought advisable to make an alteration, so as to allow vessels using the Birkenhead Docks, and at the same time loading part of their cargo in the stream, to be free from any payment whatever to the Liverpool Dock Estate, so as to place Birkenhead and Liverpool on a perfectly equal footing, I should see no objection to that. At present, a vessel unloading partly in the stream, and then using the Birkenhead Docks, has, in addition to its payment for the use of the Birkenhead Docks, to pay for unloading in the stream, not to the Birkenhead Dock, but to the Liverpool Dock Estate. I should see no objection to that being so far altered as that such payment should go to the Birkenhead Dock Estate, and so put the two sides of the river upon the same footing. I see great practical objection to loading in the river Mersey, but I cannot say at once that I see any objection to the proposed alteration. I am not cognizant of any vessel discharging her whole cargo in the river. I dare say it would tempt many to try the experiment of discharging in the river, if they were exempted from dock dues; that would be objectionable. It is almost impossible, very frequently, from the strength of the tide and the force of the wind; the exemption from the payment of dock dues altogether would tempt many to try it; that would make the navigation of the Mersey very dangerous, unless the vessels went high up above the docks. If vessels were altogether free from dues on lying in the river, it would be an inducement to make the attempt, and that would be undesirable; it is not the consideration of the vessels themselves, but the obstruction to the navigation. It frequently happens now that losses are occasioned by collisions in the stream; that is, by reason of the want of dock accommodation and of water over the sills.

Dues on vessels in the stream.

Objections to discharging in the stream.

The cargoes of the vessels are generally insured. The insurers would not permit them, if it was not considered safe, to lighten in the stream; but arrangements would be immediately effected with the insurers. In speaking of the obstruction of the stream, I confine my observation to the Mersey, between the north point of the wall now built, and the Brunswick or Harrington Dock. A little above, the banks are in the middle of the river, and it is very narrow, and there are not so many vessels; they are flats chiefly. I certainly would not send a vessel up there to discharge; as a shipowner I would rather pay the dues, and take the vessel into dock. I see no practical objection to vessels being

J. Mondell, 28 Mar., 1855. permitted to unload in the river, if they thought fit, if it was confined to the upper part of the river, above the docks. I should prefer putting up with the inconvenience of loading at the third and sometimes the fourth berth from the quay, to going across to Birkenhead.

T. Hodgson, 28 Mar., 1855.

Thomas Hodgson, examined by Mr. Burke.

I am the harbour master at Liverpool, and have been so for about 16 years. Before that I was master of a merchant ship. I have been in the service of the Dock Trustees nearly 25 years. I was dock master of the Prince's Dock. I have had nearly 25 years' experience in the working of the docks at Liverpool. We are very short of docks to accommodate the trade. There is a constantly increasing demand at Liverpool for dock accommodation; it has been gradual since I have been connected with the docks, but it has increased much of late. It arises not only from the increase of the trade of Liverpool, but also from the great increase of the number of packets having fixed days of sailing; unless they have an appropriated berth, they cannot carry out that plan. It is essential to the packet service that it should be provided with berth room on their arrival, to enable them to clear out when they announce their departure. Unless all vessels which have assigned periods for departure from Liverpool, and for arrival, have appropriated berths, they cannot make such arrangements. There is a large increase in screw vessels and other steam vessels, carrying on trade at Liverpool, requiring quay berths, and nothing can be worked over them. At the present moment a large number of steam vessels, frequenting the port of Liverpool, have been taken up by Government. The existing pressure is not so great as when that is not the case. By reason of the crowded state of the docks, we are obliged to advertise by flying a flag that no more vessels can be taken in. That flag has been flying within a period of 18 months, ending 31st December, 1854, at the Huskisson Dock 38 days, at the Sandon 312, at the Wellington 75, at the Bramley Moore 162, at the Victoria and Waterloo 350, at the Prince's 358, at George's 449, at Canning 539, at Albert and Salthouse 42, at King's 163, at Queen's 156, at Union 546, at Coburg 546, at Brunswick 476, at Toxteth 456, and at Harrington 348 days, to indicate that the respective docks were full and could not accommodate any more vessels. Those docks were sometimes inconveniently crowded; we have got so into the habit of crowding our docks in Liverpool, that we never think of hoisting the flag until they are very crowded. We have not hoisted the flag till the docks were crowded inconveniently. Taking the average of the year, 18,000 tons per acre per annum would be a fair working tonnage. We are obliged to work considerably more than that in the course of the year, from our confined space. The crowded state of the docks has the effect also of delaying the discharge and loading of vessels. It is sometimes necessary to let the docks run

Appropriated berths.

Periods during which docks have been full.

Repairs prevented.

dry for the purpose of cleaning and repairing; we are prevented from doing so by reason of the necessities of the trade. We receive a great many complaints from consignees of vessels as to the delays which take place in their obtaining berths in the docks. My office is the office of application; when the docks are crowded the office is full of applicants, from morning till night, very frequently. When there is room in the docks, vessels are admitted as they come to the entrance. When the dock is what we consider sufficiently full for working, the flag is hoisted, and all vessels are then entered at the harbour master's office, and are admitted in regular turn. It frequently occurs that vessels are delayed several days before they can obtain a berth; then they have again to take their turn for loading berths, after their discharge. When a vessel is cleared, it is allowed to enter upon a loading berth. A similar delay takes place very frequently in obtaining berths for the loading of vessels; nine months out of the twelve it is so. When vessels go into berths they are entitled to the number of days which are allowed; a limited number of days are assigned to each vessel, according to her calibre, for loading or unloading; if she exceeds those days she is turned out of her berth. It very frequently indeed occurs that vessels are so turned out of their berths.

T. Hodgson, 28 Mar., 1855.

Delay in obtaining berths.

The size of vessels has increased of late years at Liverpool very much. When I became harbour master, a 1000 ton ship would have been gazed at very much; that was considered a large vessel: our largest vessels now are 2300 or 2400 tons. They require a large amount of dock and quay room in proportion to their size. That applies to the new-class steamers, and to timber vessels also. I am acquainted with the graving docks at Liverpool. They are very much occupied now. There is a necessity for a larger amount of graving dock accommodation at Liverpool. When I left, on the 20th of this month, there were 134 vessels entered for the graving docks; I do not say they were all waiting. Every morning there were more vessels than I could accommodate. I have heard that the Persia, the new vessel building for the Cunard line of steamers, will be about 400 feet long; we have no graving dock which will accommodate such a vessel. Our widest dock is 70 feet; she is about 80 feet over the sponsons. There cannot be a doubt that the present graving docks are insufficient to accommodate the wants of the port. I know the proposed plan of making fresh graving docks; they will be a great accommodation to the trade. The proposal is, to make them of adequate accommodation for the large class of steamers. I am well acquainted with the difficulties of entering or getting out of the docks. I was examined as a witness in the year 1848. At that time, considerable objection was raised as to the entrance of the northern docks; to the Sandon Basin, which has been in use about four years, and I have had experience of the working of it during that time. It has not realised the anticipa-

Increase in size of vessels.

Graving docks.

Objections to north docks.

T. Hodgson, 28 Mar., 1855.

tions of danger which were held out at the time, but the reverse: it was opened in the year 1851. I have an account of the work done at the Sandon Basin. There is no danger in the working of that basin but what, by good management, may be overcome. I think there is less risk in that entrance, in docking large vessels during a strong wind, than at any other entrance in the port. A pilot would not choose the period of a heavy gale of wind to dock a vessel at all. They could dock a vessel at that entrance when they could not at any other entrance. I do not see any practical difficulty in the use of an entrance further northwards. I am well acquainted with the manner in which the timber trade is conducted at Liverpool now, and the place at which it is accommodated. The accommodation is not sufficient; the proposed new works will be a great accommodation to that trade, and will have the effect of relieving those (the Brunswick and the Harrington) docks, which are now appropriated for the purpose of the timber trade, and so far increase the accommodation to the general trade of the port. Vessels lying in either of those more outward docks which are contemplated being made upon that blue land, will not incur any greater risk than they do in the Huskisson Dock. We have had no damage there at all. In my opinion, this new scheme of the Dock Trustees is one calculated greatly to relieve the present pressure upon the existing docks, and to afford great accommodation to the trade of Liverpool.

Cross-examination.

Cross-examined by Mr. Calvert.

Packet ships lie in river before sailing.

Some of the packets, having fixed days upon which to start, draw as much as twenty-two feet of water. It sometimes occurs that those packets are taken out of dock some days before the time at which they are intended to start; when the water is short upon the sills. I have no statement of the number of days during which vessels of that size cannot enter our docks in the course of the year. That remark applies to the Cunard and the Collins steamers. The ships having gone out, the pilot joins them directly, and they lie in the stream taking their chance, whatever the weather may be; they complete their loading in the stream if they cannot complete it in the dock. If fixed to sail on the 1st of September, and they go out on the 20th of August, all the passengers and cargo arriving between those days must enter the vessel while in the stream; that is attended with great inconvenience; I have not heard of any loss. I do not recollect a single instance of damage occurring to ships in making their way into the Huskisson Dock. I have heard of an instance of damage at the Salisbury Dock; its entrance was not silted just outside the sill; when I left, we had the same water in the basin that we had upon the sill. The Sandon is an open basin; the Salisbury has a regular dock entrance. Inside, the basins are dredged,

as a matter of course, not the sills; there is an accumulation from the water bringing a quantity of silt and depositing it at the entrances. It is so all over the river, upon both sides; it is not more so lower down than higher up. The entrance to the Salisbury Dock is not more likely to be silted up than the entrance to the King's Dock. The dredger is as often at work in one as the other. They dredge by hand instead of by steam, in order to open the gates, at all the dock entrances. They do so at the Salisbury Dock; those gateways are narrow, and the dredging machine cannot get sufficiently behind the gates; they have a dredger which draws the mud from behind the gate, so that the other dredger may take it up and carry it away. They erected storm-gates at the entrance of the Salisbury Dock and of the Sandon Dock; these storm-gates are at no other. I cannot tell why there are storm-gates at those two and not at the others. I should suppose it was that, being so far north, they are more exposed to the west and north-west winds than the docks further south, and the gates have been placed there as a sort of double security to the dock. After the flag is up, vessels are admitted in regular turn. We may have an application for four vessels to come in; the dock master finds that he has space for four, and no more; he would then hoist his flag, and give room for those four applicants. Supposing there are four applications for four vessels to go into the dock, and there is just space for four, the dock master would hoist his flag up, reserving room for those four applications, and then the dock is full. As we make space, we admit vessels; as vessels leave, we admit others. Between the time of that flag going up and vessels going out, no vessels are admitted, except under the circumstances that I have mentioned. When the flag is hoisted, that signifies the dock is full, except such space as application has been made for. Subject to that exception, no vessels are ever admitted after the flag is hoisted, till some of those vessels which are in at first have gone out.

T. Hodgson. 28 Mar., 1855.

Same deposit all over river.

Dredging in docks.

Storm gates.

Admission of vessels when flag is up.

Re-examined by Mr. Burke.

The storm-gates at the Salisbury Dock and the Sandon Dock were erected for extra precaution. The dredging machine is constantly at work to relieve the docks where they silt up; the hand-dredging is an auxiliary to the general dredging. It is desirable that the docks should, from time to time, be let dry to be cleaned more perfectly; that is impeded by reason of the crowded state of the docks and the inability to free them from vessels. The necessity of running the docks dry is not so much the silting as the wear and tear of the gates. Some of the vessels drawing twenty-two feet of water is an obvious reason for increasing the depth over the sills; at this proposed new entrance there will be a greater depth than at the present one; I attach very considerable importance to that.

By the Committee.—The general police of the port of Liverpool is not

Police of the river.

T. Hodgson, 28 Mar., 1855.

under my superintendence as harbour master; that is under the head constable. The general arrangements as to vessels is with the water bailiff. Inconvenience frequently arises from the crowded state of the stream. When I came away, on the 20th of this month, there were 30,000 tons of shipping in the river. That was owing to the crowded state of the docks; we could not take them in. If the exemption of a vessel loading in the river from dock dues tended to increase the number of vessels loading in the river, there would be a practical inconvenience. I cannot tell how far such exemption would tend in that direction; it would be a question of expense. I have not considered the question much. It would be a serious inconvenience if many vessels availed themselves of it. The existence of 30,000 tons of shipping in the stream was on account of a westerly after a long easterly wind. We frequently have a long prevalence of easterly winds at certain periods of the year. The dock masters are under my superintendence.

J. Cook, 28 Mar., 1855.

Joseph Cook, examined by Mr. Webster.

I am superintendent of the pilots, and have filled that office sixteen years next June. The pilot establishment of Liverpool consists of twelve vessels, averaging from fifty to ninety tons. There are 230 pilots. I have frequently observed a great many vessels lying in the river. I have seen as many as a hundred vessels, which are kept out of the docks for want of accommodation. That want of accommodation retains the pilots in the river when they might be required outside. The pilots remain on board till the vessel gets docked; that is the invariable practice. It inconveniences the establishment. The vessels have increased very much in size lately, and there is a great requirement for more dock space. My attention has been directed to the facility and safety with which vessels are docked at the Sandon Basin, the present most northern entrance. Any difficulty in docking through that basin depends upon the state of the weather; if the weather is moderate, such as a vessel ought to attempt to dock in, with a large basin like that, I cannot conceive of any inconvenience. When this matter was under consideration in 1848, there were various prognostications about the difficulty, not to say the impossibility, of docking at that spot. I was one of those who thought that the carrying docks so far to the north would have been injurious. I find I have been wrong. The experience we have had since the Sandon Basin has been opened, of docking through that basin, shows that the opinions and the prognostications of others were wrong in that respect. In heavy weather, in the Mersey, it is not prudent to dock at any of the docks. According to present practice, the docking almost invariably is accomplished by the aid of steam tugs. That would be the case on both sides; on the Cheshire as well as on the Lancashire side. I do not think, from our experience of the Sandon Basin, that the number of days during which any vessels would

No docking in heavy weather.

be prevented docking at these northern entrances would be many in the course of a year. *J. Cook*, 28 Mar., 1855.

There is in the Mersey a bank called Pluckington Bank, extending along the entrance of the southern docks. It is a serious obstacle to the larger class of ships; it has proved very serious to many heavy ships in proceeding towards the southern docks. Having regard to that natural defect in the river Mersey, it is of importance that the larger ships, the timber ships for example, which now enter the Brunswick Dock, and have to encounter that, should be relieved of it by being removed to the north. Without reference to the additional accommodation which can be furnished for those ships to the north, it is desirable, as a question of navigation, that the large ships should not be required to pass up to that southern part of the river. The proposed works will be of advantage in diminishing the transit of vessels through the more crowded parts of the river. I have heard that large vessels will have no occasion to go up to the southern estuary, and therefore that will obviate the risk of encountering the most dangerous part of the river, that is the Pluckington Bank. The danger from collision increases with the size of the ships. I look at it as one of the recommendations of this northern scheme that that larger class of ships would avoid the risk of collision in the river. Pluckington Bank.

Cross-examined by Mr. Hardy. *Cross-examination.*

I have been in favour of docks at the north end since I perceived I was in error relative to extension northwards by the practical results which have transpired by working the Sandon Basin; it is an open basin. I was examined on the timber inquiry in 1850; at that time I had a strong opinion against the northern docks, for the reasons I have given. When examined upon the timber trade I said, "I am satisfied when it is blowing hard from the north and the west in the winter months, a man would have very little respect for his ship if he took her to the leeward on the north shore," and I would say so still. I dare say I said I would rather dock at Birkenhead; the entrance to Birkenhead is north-west, and I could dock there with more ease. I have said there are frequently 100 vessels waiting to be docked; the majority of them would probably be of the larger size. It has not occurred to me to inquire how many of them are waiting for water to get into the docks, and how many for space in the docks. I have not turned my attention to the removal of the timber trade to the north end of Liverpool, beyond being satisfied that the removing the timber trade to the north, and obviating the necessity of the ships having to encounter the crowded part of the river and Pluckington Bank, must be very desirable. I think it likely that there will be fewer collisions if you take the timber to the north end. The landing stage causes a great traffic in ferry boats; a great number of vessels are anchored above Docking in bad weather. Collisions in river.

J. Cook, 28 Mar., 1855.

the landing stage, and up towards the Sloyne. If you can obviate the necessity of those vessels moving in a crowded state of the river, you must obviate the risk of collision. I think I said, in 1850, that if the timber trade were carried to the north end, and put in flats to go up towards Runcorn, that transit would run great risk of collision. I have no doubt of it. Assuming that the entrance at Birkenhead is ninety feet wide and twenty-two feet deep, vessels could go in there with perfect ease, but I think not without steamers; some of our pilots might take them in without steam. If a timber vessel comes up to the north docks in a gale from the north west, her course would be to go to the south, and lie by till the weather moderated, or come to an anchor at the magazines. She would get to the weather side if possible.

By the Committee.—As the docks have gradually progressed to the north, I think there has been very little change in the stream or in the direction of the tide. There are two main channels into Liverpool; one called the Rock Channel, which nearly runs at right angles with the General Northern Channel. Those two tides meeting have a tendency to drive the general stream over to the eastern shore, and then, after meeting with the abrupt obstruction upon that shore, it crosses over to the Cheshire shore. I have never been an advocate for pinning up water; that is, running river walls out. From what I have heard as to the necessity of a wall being built to prevent the taking away of land on the Cheshire shore, I think that would be beneficial. The extending the wall further towards New Brighton might be injurious; for instance, at present the water is shallow there, and a great deal of water is spread over that estuary, and I believe that, with the other river at the back, is the principal reason of our having the ebb tide so much longer than the flood, and so giving a good and safe channel.

Two channels in the Mersey.

William Hughes, examined by Mr. Webster.

W. Hughes, 28 Mar., 1855.

I am master of the No. 1 pilot boat, and have been at Liverpool all my life. I have been thirty years a licensed pilot out of the port, and twenty-one years master. I have had experience of docking at the Sandon Basin many times; with a basin that vessels can enter, no matter how it blows; a vessel can dock at the northern docks as well as at the south docks, so long as there is an open basin for them to go in, and out of the tide-way and out of the sea. I saw a vessel last Sunday but one, when it was blowing a gale of wind,—one of the largest steamers which comes to the port,—I saw her going into the Huskisson entrance without touching the piers at all. The Sandon is an open basin. When you are docking at the Brunswick Dock, you have nothing but the piers to go alongside of, and the vessel takes damage alongside of them; but so long as there is an open basin, you get out of the tide and out of the sea in the basin. I do not see any difficulty in docking at those northern docks; my opinion is, that when it is blowing hard, you could dock in

Vessels can dock at all times through a basin.

W. Hughes, 28 Mar., 1855.

those northern docks when you could not get a vessel in or out of the Cheshire side, unless she were a steamer to steam in, or she had some powerful tug-boat; whereas, on the Liverpool side, you could sail her into the basin with the wind at west-north-west. I shared in the opinions and prognostications of those in 1848 who said that the northern entrance was so exposed that you could not dock there; but afterwards I suggested to Captain Evans, if they were to make open basins, I thought vessels could dock at the north as well as the south end. I have known as many as seventy to eighty pilots on board ships in the river at one time, when there has been a prevailing westerly wind. All moderate-sized vessels and large ships keep the pilot on board till they go into the docks. Some vessels have laid a week, or four or five days, or even ten days; I have been detained ten days myself. I have been on board a ship thirty days; but it has been for quarantine and all together.. There is this detention in the river for many days. I have seen sixty or seventy sail of ships at one time waiting in the river, unable to be docked. My opinion is, that when the northern docks are opened, the pilots will be glad to go there; there is no bank to contend with there; there is as much water, and they can get into the basin with less risk of doing damage, whereas many pilots have got into difficulty in docking at the Brunswick Dock. So far as it is a comparison of advantage and convenience between the north and the south docks for the larger class of ships, I give the preference to the northern docks decidedly.

Detentions in the river.

Cross-examined by Mr. Hardy.

Cross-examination.

With open basins we can do a good deal. I suggested an open basin to Captain Evans, and an open basin has been made. I am satisfied it will answer, because you get out of the tide into the basin to get the vessel into the dock, whereas at the outer piers there is more sea. It is easier to get into an open basin than into a dock with gates, where the gates face the river. There are gates at the entrance of the Salisbury Dock, but they are well in; they are not the same as the Brunswick Dock entrance. If there was an open basin at the Salisbury Dock, vessels could dock more easily. I have known ships go alongside the quay at the Salisbury Dock, and on account of not having an open basin, they have had to come to an anchor in the river again. A ship can run into the basin and let go her anchor; with the wind at the north-west, she can sail into the basin and let go her anchor. We could sail a vessel into the northern dock; I think the entrance is 100 feet wide. If it is blowing a heavy gale of wind, the pilot would not dock at any dock; I am speaking of a moderate gale. No ship can dock at the weather side in a heavy gale of wind; not with a steam tug. I have been coming up the river when it has been blowing a gale, and I have had to let go both anchors. I had enough to do to bring the ship up. Supposing a gale sufficient to keep a vessel out of the north docks,

Advantage of open basins.

No docking on weather side in a gale.

W. Hughes, 28 Mar., 1855.

she could not, with the wind north-west, sail in at the weather side. I think a vessel has a better chance of docking on the lee side. With the wind N.N.W., you can sail into the basins either side; there is no difference. With a N.N.W. wind you would have smooth water on the weather side; a vessel would steer in with the wind at N.N.W. Our prevailing winds are west, and west-north-west, and west-south-west.

When I go on board a vessel which has to remain in the river, I remain there till she is actually docked. I remember the case of the Lightning last year, a clipper, from Boston. I do not know how many days she had to lie in the river; the tides were low when she arrived, but she would not have occasion, on that account, to remain in the river 13 days, if she went to one of the north docks; they must have been wanting to put her into some particular dock. I know from the tide that she would not have occasion to remain in the river 13 days. I never heard of a vessel losing her topmast from a gale in the Huskisson Dock. I remember a vessel losing her mizen-topmast in the King's Dock in a January gale; her mizen-topsail was blown from the yard.

Cross-examination.

Cross-examined by Mr. Gregory.

No recent alteration in set of tide.

Since I have been a pilot I do not see any alteration in the setting of the tide; since I have been coming backwards and forwards in the river, before the docks were made, the tide set at Millhouse Rocks, and from there towards Seacombe Point, and now they have built the wall the tide still comes from towards the Waterloo Docks, more over towards Woodside—that is the narrowed part of the river. In westerly gales the Cheshire is the smooth water side of the river. Generally there is a great wash of land from the Cheshire shore. The walls have been carried away which have been constructed there. Mr. Cook stated a sea wall would save the land from being washed away; it is sure to wash away there in time. I do not pretend to say that it would be any advantage to the navigation; there is a tremendous tide in the Liverpool river; I have seen the tide running nearly seven knots; we shall always have Liverpool a seaport town with deep water from the tide. A sea wall would save the land; it is sure to wash away unless they do build a wall; it is all clay land. The set of the tide is not towards Egremont; there is always an eddy tide from Egremont, very near to Seacombe Point, so much so that there is a bank there off Egremont, near to Seacombe Point.

Wash of land from Cheshire shore.

Run of tide.

Eddy tide at Egremont.

Re-examined by Mr. Webster.

The Lightning would not have had to stay in the river 13 days if they had not wished to take her into some particular dock. From high spring tides to neap tides and back again is only 14 days. It is at neap tides that the difficulty arises; and only for the largest class of ships. We have now a little more water at the north than at the Queen's

Dock; you may dock a vessel with two or three more feet of water at the north than you can at the south docks. *W. Hughes, 28 Mar., 1855.*

Thursday, 29th March, 1855.

THE RIGHT HONOURABLE HENRY LABOUCHERE IN THE CHAIR.

Robert Rankin, examined by Mr. Webster. *R. Rankin, 29 Mar., 1855.*

I am a member of the firm of Rankin, Gilmour, and Company, of Liverpool, and of the firm of Pollock, Gilmour, and Co., of Glasgow. We do a considerable amount of business, and are one of the largest shipowners in Great Britain. I am a member of the Dock Committee, elected by the ratepayers. My attention has been called to the proposal of trustees for providing accommodation for the timber trade at the north end. I have given a good deal of attention to that scheme. Our firm is very extensively engaged in the timber trade. We have establishments at Liverpool and Glasgow, and abroad. We have three or four establishments in Canada, three in New Brunswick, and two in the United States. The want of accommodation for the timber trade of Liverpool for many years past has been a serious impediment to its extension. The expense of conveying it to where it could be yarded has been considerable. The south end has been and is the only place where we can stow timber. Latterly there has been some accommodation at the Huskisson Dock. At the south end, the timber has to be conveyed on carriages a quarter of a mile, and a good deal of it up hill, and then it has to be piled in the yard to a great depth from want of room; twenty or thirty feet high in some cases in the case of deals, and ten or twelve the square timber. A great barrier and impediment to the timber trade arises from the want of piling ground. At the south the ground is both expensive and inconvenient. I am satisfied that this north shore scheme will afford very great accommodation for the timber trade. The dock is large, and it would contain all the ships that ever could be expected to enter there. The float will admit of a great deal of timber being kept in the water. The quay space would afford a great deal of accommodation for ships to discharge and leave their cargoes upon that quay, which have now to be removed very expeditiously. The yards immediately above where I was pointing out would admit of timber being stored very conveniently and at very little expense, so that it could be removed by railway, or by flats, or by the canal to the docks, with a very small portion of the expense which is now incurred. The ground is quite level. It is so contiguous to the docks, that, in fact, it affords a sort of warehouse accommodation. It is even more necessary for timber to have storing ground immediately con-

Wants of timber trade.

Sufficiency of proposed accommodation.

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tiguous than for other goods, from the small value of it compared with the bulk. Contrasting this scheme with the south end, it is perfectly unobjectionable. There is nothing like it in the kingdom. There will be communication with the line of rails which is to be introduced both on the high and the low level, and also with the Leeds Canal; and the flats coming in and going out can come in and go out an hour earlier in the tide than they could from the south end, which is a great advantage. It was supposed the flats from the north might require two tides instead of one in going up the river, but from the fact of their being able to leave the dock earlier it has been ascertained they will not lose any tide. Owing to the sills of the docks at the south end they cannot leave till a certain period of the tide. There would be a great advantage in the timber ships not having to go up the river. The busy part of the river is opposite the landing stages, and they would very seldom have occasion to go above there in entering or departing from the Mersey. Pluckington Bank has been found to be a very serious inconvenience; it rises two or three feet higher than the sills. The larger class are more subject to the inconvenience than the smaller vessels. I cannot think the Dock Committee could obtain anywhere better accommodation for the timber trade than is now proposed; the ground upon which it is made is so cheap that I cannot for a moment imagine that you could afford better accommodation anywhere than there. I was of opinion that the strip was too narrow before the ground was purchased from the Earl of Derby, but now I think it is very complete. I always entertained the opinion that the original plot of land was too narrow. About the year 1850 there was a feeling against the north end scheme, and a sub-committee of the Dock Committee took into consideration what could be done with the south end, so as to continue the trade there, and they agreed to certain proposals to make a small dock upon the Harrington Estate, and to do a few other things, so as to give accommodation to the trade; but I felt so sensible that that was a mere make-shift, that I proposed a resolution in the Dock Committee to set that aside, and to have a committee appointed who should take into consideration a scheme of a much more comprehensive nature. I succeeded in carrying that motion. I had no desire to press the matter upon the public till they should feel the want of it themselves, but the want of greater accommodation became so imperative that one deputation after another waited upon the Dock Committee to say they could not find accommodation for their trade, so that it has been forced upon the Dock Committee to carry out this scheme at the north end. The opinion of the timber trade has changed to a great extent; the class of vessels which has come to the port has forced it upon them. The Huskisson Dock last year was quite as full as the Brunswick. Many of the vessels were too wide to have entered into any other than the Huskisson Dock, and a large portion of the trade was done at the Huskisson Dock last year.from necessity in fact. The

Convenience to large vessels.

South end inadequate for the purpose.

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increasing size of the ships, and the great increase in the trade, has forced it. The dock accommodation is very limited at present. I had occasion, some years ago, to look very closely into the proportion of dock dues on ships and goods and derived from timber; at that time I was of opinion that one-seventh of the entire revenue of the Dock Estate from tonnage on ships and dues upon goods was derived from the timber trade; that might be five years ago. From a very rough analysis I found, taking the dues upon ships and the dues upon their cargoes, that one-seventh of the revenue from ships and goods was then derived from the timber trade. My impression is, that from dues on ships, and on timber, including American timber, and Baltic timber, and pitch pine from the States, it is at the very least 35,000*l.*; and, if I recollect, the entire dues to the Dock Estate, from the trade of last year, was 316,000*l.*, so that excluding lights, which is 30,000*l.*, it would be now about one-eighth part. I am quite certain that one-eighth part of the dues is derived from the timber trade. The cost of tug hire is not more to the north than to the south; quite the reverse. Our ships, of course, are of a larger class than the generality which frequent the port, but when I have occasion to dock my vessels in the Brunswick Dock, I require to pay steam tug boats quite as much as I require to pay for docking at the north, from a very simple reason; the Pluckington Bank is very dangerous, and also the entrance into Brunswick Dock is narrow, whereas the basin into the Huskisson Dock is wide, and you can approach it at any period with great ease. Assuming that Birkenhead should become the property of Liverpool, my impression of the trade of Liverpool is such that I believe both the accommodation which is to be afforded north, and the accommodation which will be afforded at Birkenhead, will all be required within the next twenty years, and more than that. The trade of the port, which in 1814 was 548,000 tons, in nine years and a half doubled; in fifteen years and a half again it doubled; and in fifteen years it again doubled. That is to say, in forty years the trade of the port is eight times greater than it was forty years ago, and I see no reason why the trade of Liverpool is not greatly to increase.

One seventh of revenue of Dock Estate from timber trade.

Rapid increase of trade of port.

Cross-examined by Mr. Calvert.

Cross-examination.

I should be glad if part of the timber was retained at the south end, if the dealers were willing. I would rather have the north end, and the south end, and Birkenhead, than I would have one market as a seller, whereas the dealers are not willing to be placed at any other than one spot; and therefore to have a large accommodation at the north end, and to be concentrated, would be for the convenience of the trade. I should myself prefer to have various markets, but I find that is not convenient for the dealers; they will not agree to it; the middle men will not. My business is that of an importer; I sell to those persons who deal in it

Part of timber trade at the south.

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by retail. I am acquainted with the report which came from the timber trade in 1850, and the four resolutions at which they arrived. The resolution of the General Committee I always considered was quite at variance with the opinions of the majority of the sub-committees. With respect to this one-eighth of the dues proceeding from the timber, I think about 180,000*l.* is derived from tonnage, and about 136,000*l.* is derived from dues upon goods; that is 316,000*l.* or thereabouts; that is setting aside any income derived from warehouses, and the graving docks, and such establishments; such as are quite independent of any particular trade. Birkenhead, supposing it to be completed, would act as a means of correcting any monopoly on the part of the Trustees of the Liverpool Docks, to a certain extent, provided the goods would bring the same money; but there is that prejudice against Birkenhead at present that we cannot obtain so much by 2½ per cent. to 5 per cent. for goods imported upon that side as upon the Liverpool side, which is a barrier, to a certain extent, at present. It is very difficult to change a market, and there are great inconveniences in removal; the great market is upon the Lancashire rather than the Cheshire side, so that it is not to be wondered at to a certain extent. The north end will cost so little compared either with the south end, or with the outlay at Birkenhead, that I cannot for a moment conceive that anything can compete with it. The Dock Trustees, you are aware, have no personal interest; it is a national undertaking, and the object is to reduce the rates to the very lowest scale at which the business can be carried on, as has been exemplified on many occasions; for example, in 1836 there was a very large reduction of the rates, to the extent of 38 per cent., and in 1844 and 1848 again. I do not think the way to secure reductions of that kind, is to support and encourage the rival on the opposite side of the water. The competition of Birkenhead has had nothing to do either with the exertion of the Trustees, or with the reductions they have made. There is a very great deal more sawn timber now introduced than there used to be; there have been extensive mills erected within a few years in Canada and New Brunswick. Balk timber has not increased in proportion to the deals; this operates upon the consideration of whether timber is piled or not; it is more easy to pile sawn timber than timber in the original state. Square timber is piled 10 or 12 feet high; deals are piled to the height of 30 feet. Rent is a very small matter compared with manual labour; no doubt it cheapens the rent. Timber does not bring quite the same price at the north end that it does at the south, but that is from the greater portion being at the south end; whereas if the north was the situation where all was to be, it would bring as much there as at the other end. Timber is sold by sample to a certain extent; my own I sell by the reputation we have obtained. I think it very desirable that there should be the accommodation of a float, that parties might have their choice. I think it very important that there should be storage in water as well as on land.

Prejudice against Birkenhead.

The south end has the advantage of about three miles, for communication up the river, but you do not lose a tide from the north end, you may start so much earlier than you can at the south end; quite as early as the floats can come out of the docks there; so that it takes precisely the same time. With respect to the incumbrance upon the river, it is somewhat upon a balance. Large vessels will not require to go up with their cargoes then, but the small vessels have to carry the goods upwards; so that upon the whole I think the river will be more clear than if those ships were docking at the south. If ships enter at the north end they have no occasion to pass the landing stage; it will follow that the portion which goes by flats has to pass up the river, but that is done at an early period of the tide; and as a great portion of the timber will be removed by railway, and will not come upon the river at all, I believe the river will be a great deal clearer than it would be provided large ships have to go to the south end. I cannot speak as to the actual proportion which goes up the river, as compared with that which goes by canal. A large portion of it has gone up the river hitherto, but there were no facilities by rail till recently; the quantity which will in future go by railway will be increased, and that portion going by water very much lessened. You have both a low level and a high level at the north; but the difficulty I speak of at the south end is, that you have to cart your timber to the rail, whereas the railway may come to the very timber itself. The dealers have not the opportunity of keeping their timber upon the Brunswick Dock quays more than forty-eight hours, therefore it has to be carted to yards at a considerable distance, which a railway cannot approach to. We have had that accommodation from the Harrington and the Herculaneum ground, and much more for years, and all that has been found inadequate.

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Relative time and conveniences of north and south.

Re-examined by Mr. Webster.

I look upon the yellow land as very important. I am quite satisfied if you were to make docks, confining yourself to the ground which has been bought from Lord Derby, the question which would be asked by every one would be, why did not you secure the ground to the rear? Because that has been the error which has been committed from time immemorial in the Liverpool Docks, taking a slip in front, and leaving the ground behind unoccupied, till it was so built upon that it could not be acquired. The omission to acquire neighbouring land has been a perpetual error on the part of the Liverpool Dock Committee. It is of great importance that a similar error should not be committed now. You have a great deal of expense to incur in the formation of a front river wall; it is of the greatest importance to have as much rear space as possible, which can be taken into the docks at a very easy expense.

Error in taking too little land.

The certainty of tenure which the timber trade would have under the Dock Trust, is a very important element; to use a common phrase, they had been kicked from post to pillar for the last thirty years.

Certainty of tenure.

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With this plan, they would use machinery to do a great deal of labour which is now done by hand, and save expense to the consumers of the goods. No large establishment could be put down, or proper erections made for obtaining to the fullest extent the advantages of machinery, without this certainty of tenure. Whatever may have been the variations of opinions in former years, the timber trade are now almost unanimous upon the point of accommodation at the north.

[*By the Committee.*—I am one of the Dock Committee, and have been for ten or twelve years. The Corporation and the Dock Estate divide the expense of the conservator's salary, about 200*l.* a year each. I cannot say whether any part of the proceeds of the Dock Estate goes to general harbour purposes at Liverpool.]

Harbour and dock dues distinct.

[*By the Committee, to Mr. Turner.*—There are dues which are specially raised for buoys and lights. There is a separate account kept of them, and they are revised by three parties, the chairman of the Dock Trustees, the senior of the Cheshire magistrates, and the mayor of Liverpool; they revise them every three years, so that they shall not be more than adequate to the purpose. With the harbour beyond the buoys and lights we have nothing whatever to do; it is for the buoys and lights those dues are levied. My impression is, that all the works which are contemplated by us, and the whole of the works which are contemplated at Birkenhead, will, before the next twenty years, be wanted for the trade of the Mersey.]

Birkenhead treated as a foreign port.

If a vessel goes into the Birkenhead Docks and discharges there, and then loads in the Liverpool Docks, it pays rates in both instances; it pays the full rates at Liverpool and Birkenhead. A vessel which discharges in London, and then loads at Liverpool, is treated as a coaster. But if it discharges at Birkenhead, and then loads at Liverpool, we do not treat it as a coaster but as a foreign vessel. The entire income of the Dock Estate last year was 385,000*l.* About 40,000*l.* of that is paid by the timber trade. The whole outlay, as far as I remember, of the north dock scheme to suit the timber trade, will not amount to a million of money, including docks, basins, timber quays, and storing ground. The revenue upon timber from Canada, the Baltic, the United States, and the West Indies, is, at the least, 40,000*l.*; and I venture to say, the timber yard rent from the storage ground there will be, at the least, from 10,000*l.* to 15,000*l.*; and for ship-building yards, and other trades, it will bring a revenue of 60,000*l.*, while there is only 40,000*l.* interest. It was the duty of myself, and other gentlemen connected with me, to consider what was the best accommodation which could be afforded; and in conjunction with the surveyor, these plans have been brought forward as the best which could be provided for the accommodation of all the trades. The instructions to our surveyor had no reference to the Cheshire side of the Mersey. There were requirements which are far from being satisfied on the Lancashire side, and the Dock Committee would be very much wanting in their duty if they did not

provide accommodation for the trade of the port. I cannot say that we ignored altogether the question of dock accommodation on the Cheshire side of the river: we provided nothing on the Lancashire side of the river but what we were perfectly certain would be required. The Cheshire side of the river has often come into our consideration. No instructions were given to our officers to survey that side; it does not belong to us. The Corporation of Liverpool has no land there adapted for such docks as are necessary; it is now making graving docks and building-yards on all the land it can conveniently convert for that purpose. *R. Rankin*, 29 Mar., 1855.

Ralph Brocklebank, examined by Mr. Webster. *R. Brocklebank*, 29 Mar., 1855.

I am a large shipowner. Our firm has built a great number of ships. We have a building establishment at Whitehaven. I carry on business at Liverpool. I am a member of the Dock Committee, elected by the ratepayers. The south end, both in reference to the nature of the ground and its extent, and situation and level, is inadequate for the piling of timber. The land which the Dock Committee propose to take at the north would be a better site for the timber trade than the south end. As regards the accommodation of the shipping generally, in my opinion it is very desirable that the Dock Committee should have the power of affording the accommodation which they seek by this Bill. As a member of the Committee I took all the pains I could to inform myself of the various means by which the trade could be accommodated. The plan now before the Committee is the result of such deliberations.

John Bernard Hartley, examined by Mr. Merewether. *J. B. Hartley*, 29 Mar., 1855.

I am the son of, and associated with, Mr. Jesse Hartley, who has been the engineer of the Liverpool Docks since 1824. My father has either built or rebuilt all the docks upon this line of frontage in the Mersey, with the exception of Prince's Dock and Queen's Dock. I have taken a very active part, the last few years, in dock building at Liverpool. I have been engineer to the Hull Docks since the year 1842, and have very nearly doubled the original accommodation there. The plan before the Committee has been made under my directions from instructions received, from time to time, from the Committee. I reside at Liverpool, and am well acquainted with the docks generally. By the Act of 1848, section 23, it is enacted "That when and so soon as the purchase from Lord Derby and Lord Stanley shall be completed, it shall be lawful for the Trustees, and they are required to erect, as part of the said works, a sea or river wall, with an embankment to extend northward, from the north-west angle of the river wall at the north boundary of the estate of the Trustees, and such sea or river wall shall terminate at the extreme northern boundary of the land to be so purchased, and according to the line to be laid down upon a map or plan to be lodged with the hydrographer to the Admiralty, to be approved of

Requirements of Act of 1848 as to river wall.

J. B. Hartley, 29 Mar., 1855.

by the said hydrographer, and also by George Evans, Esq., acting conservator of the river Mersey, and the said sea or river wall shall be well and sufficiently backed up, and shall have all such entrances into the dock, and so on, provided that the said sea or river wall shall be vested in Trustees for dock and ship building, and for the benefit of the navigation of the river." Mr. George Evans, who is referred to in that section, is the acting conservator of the Mersey. I know the existing river wall in front of that land; that is the river wall referred to in section 23. After the passing of the Act of 1848 that river wall was commenced. That wall is set out according to the direction of Captain Evans, with a view of being extended, if thought necessary, still further towards Crosby Point. I gave evidence upon the Bill of 1848; the direction of the wall is in accordance with the Admiralty view, expressed when we were in committee. I have constantly heard from Captain Evans that the line was settled between him and Admiral Beaufort, the hydrographer to the Admiralty, and the wall exists in the line prescribed by those two gentlemen. Captain Evans frequently comes to Liverpool, and has then access to our offices and an inspection of our plans. No part of the plan before the committee at all alters that state of things so approved by the hydrographer and Captain Evans. No part of the work alters the existing state of things, except the shutting up of a piece of wall which has not yet been completed, and carrying out the basin at the north end, which will take down a little of the existing wall. That piece of wall is left out for the general purposes of construction, and for the use of our vessels. We have formed a kind of harbour for our own vessels there, and for purposes of that kind. There is no operation connected with the estuary in the proposed plan. The river wall of 1848 is a continuation of the river wall of 1844, as to which there was a very great discussion on both sides of the question. That was the time when the Birkenhead Dock scheme and the Liverpool Dock scheme were before Parliament, and I think almost every engineer of repute gave his opinion upon one side or the other. The line towards the estuary, of which the plan of 1848 was the continuation, was fully considered in an engineering point of view. The line, if produced, would fall a little within Crosby Point. Every work under this Bill is inland of that line of river wall. The area of No. 1 Dock is about forty-five and a half acres, and the area of No. 2 is about sixteen and a half acres. The eastern quays of these docks are laid out for the purpose of discharging timber from the ship's bow on to the quay, as they are now discharged at the Brunswick Dock quays; these docks will be entered from the river by two open basins of the dimensions of five and six acres each; there will be a passage communicating from each to each. There is a passage with 100 feet gates communicating between No. 1 and No. 2, through the half-tide basin, No. 10. The width of the lock of No. 8, as communicating with No. 1, is sixty feet, and the length of the chamber is 300 feet. The other lock is 100 feet in width, and

Wall constructed according to plan approved by the Admiralty.

Area of proposed works.

the length of the chamber is 500 feet. The timber yards are designed 500 feet in depth, giving an area of storage of 265,833 yards. On the eastward of the storage yards there will be another quay, or a road, sixty feet wide. There will be land appropriated to the trades connected with shipping; trades requiring water frontage which can only be provided by the Dock Estate. *J. B. Hartley, 29 Mar., 1855.*

The land belonging to the Dock Estate which forms a portion of this scheme is 249 acres; that includes a portion of the Huskisson Dock. Of the land sought to be obtained by the present Bill, there is some from Lord Derby, the pink, which you were bound to make for Lord Derby under the Act of 1848, as the price for the strand and frontage you were taking. We get for the 90,000*l.*, 165,334 square yards from Lord Derby; nearly 35 acres. The total area of the land to be appropriated to carrying out this scheme will amount to 450 acres. The estimate of these works is 1,748,379*l.* Mr. Stuart's estimate of the value of the land is 874,000*l.*; that will make a gross total of 2,622,379*l.*; that is the total cost of the design for the docks on the north shore. It is proposed to deepen the Queen's Dock, at the cost of 14,524*l.* That is one of the oldest docks in the port—at least it is left in its ancient state—all the others, with the exception of this, I think, have been adapted to the present wants of the port; as regards depth, it is a shallow dock, and we propose to deepen it, and to make some alterations in the entrances. We intend to alter the passage between the Queen's Dock and the Union Dock; that will cost 16,729*l.*; also to alter the passage from the Union to the Brunswick Dock, at a cost of 16,729*l.* Uniting the Coburg and the Union, 8,358*l.*, by cutting out the tongue which now divides them, and throwing it all into one long dock; also to alter the entrance of the present half-tide basin of the Brunswick Dock, and unite the basin with the Brunswick Dock, at a cost of 17,175*l.*, making a total for these works of 77,726*l.* The purpose of that expenditure is to adapt those docks more to the wants of the shipping now frequenting the port. It is apart from the general plan of new works, either at the north or the south end; those are merely alterations in the existing works, to suit them to the present wants of the trade of the port. As to the Harrington Dock, it is proposed to take power to raise 200,000*l.* to be employed there at some future time; but there is no design laid down for the works, as to what will be done. There was a plan laid down when the Act was obtained in 1844, and that would be somewhere about the sum that would be required to carry out that plan, having spent what we have in building the river wall. A great portion of it is occupied by the timber trade now. Nothing can be done there till we have enabled the timber trade to remove; it has been very often proposed to do something there, but it has been given up through not being able to get the timber trade away. We want warehouses on the margin of the existing docks. On the south quay of the Waterloo Dock, we propose to erect warehouses at a cost of 72,275*l.* We have

Estimate for works.

Alteration in existing works.

Harrington estate.

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power under our Acts to build warehouses on any portion of the Dock Estate; we want the money. Prince's Dock west quay is 197,421*l.*, and the east quay, contingent upon the street, being altered, is 150,577*l.* We must push our boundary wall further back to the eastward, the cost of which will be 4,537*l.*; making the total of expenditure at that point 352,535*l.* At the west quay of George's Dock 82,075*l.* It is proposed by the Corporation to make an improvement of the street upon the east quay, which we should take advantage of for building warehouses; we should expend there 85,750*l.*; there would be an alteration of the boundary wall consequent upon that, at a cost of 8103*l.*, the total being 175,129*l.* At the east quay of Brunswick Dock two stacks of warehouses, the estimate being 345,720*l.* Then there will be the cost of raising the east wall of that dock, now a low wall, for the purpose of discharging timber from the docks; it must be raised to the level of the general quay of the docks, at a cost of 6000*l.*, making a total of 351,720*l.* at the Brunswick Dock. The total cost of works under this head is 2,978,564*l.* The whole of the warehouses I have been describing, are proposed to be built on land now belonging to the Dock Estate, with the exception of that which we take from the Corporation, when the line of street is altered. To that total cost of works 2,978,564*l.*, adding Mr. Stuart's valuation, 874,000*l.*, for the land, makes a grand total of 3,852,564*l.* A plan was sent by the Admiralty, with the line of wall shown upon it, to Captain Evans; there has been no other plan that I am aware of. We have not conformed to the 24th section of the Act of 1848.

Warehouses and other works.

Cost of works.

We have always considered Captain Evans to be the party to apply to, as the conservator of the Mersey; he is continually coming down, and we have relied upon his not finding any fault, and upon things being done in accordance to his desire. We never laid before Captain Evans any working drawings. We have not executed the wall according to the plan deposited in the year 1848. We have constructed the wall in accordance with Captain Evans's wish that we should go to Crosby Point; we have considered him as paramount in the matter. The wall has gone considerably to the westward; that is, towards the stream. I was examined in 1844; it is a long time ago. I have not here the plans which were deposited in 1844. That is a copy of the plan, and it was intended to have, in the first instance, north of the Clarence Graving Docks, a long narrow basin going up in-shore, from which a series of basins up to the canal were to extend, of a larger character than those which are shown in the plan. Then to the north of that was to be one long dock, extending round as far as the north side of the Bramley Moore Dock. Then there was a large half-tide basin to the north of that again; there were to be three graving docks to the north of those again. It was the intention of the then Committee of the Dock Estate, I have no doubt, to carry out that plan which was laid before Parliament. I do not remember the estimate for that plan. They built a portion of

Works of 1844.

the river wall on the Harrington Estate. When we purchased it from the Harrington Dock Company the two docks which are now shown upon it were existing, and to the north of that it was shore land, the tide flowed over a great portion of it. The amount of money which has been paid for that estate was 261,000*l.*, and we have spent 34,000*l.* The acreage of the Harrington Estate is as nearly as possible 30 acres. I can give you what we have spent each year: we have spent 1,095,450*l.* upon the ground to the north; we spent, in 1845, 79,838*l.*; in 1846, 203,593*l.*; in 1847, 234,333*l.*; in 1848, 273,342*l.*; in 1849, 165,117*l.*; in 1850, 82,852*l.*; in 1851, 55,520*l.*; in 1852, 852*l.* There was an act passed in 1846; that was, I think, confined to the Wapping Docks, and did not apply to the Harrington Estate, except to some slight extent; we took some extra land. I recognise the outline, it was in truth an alteration from the mode in which it was proposed to lay it out by the act of 1844—fresh money was taken under the act of 1846, one million, chiefly for the Wapping works, I think, and Nova Scotia. We have spent nothing upon Nova Scotia, with the exception of keeping up some old buildings; it has been a mere nothing. We have spent at the Wapping Docks in enlarging the salthouse, and Wapping Basin, and the Wapping Dock, and putting entrances to the Queen's Basin, 198,038*l.* Nova Scotia is 7 acres and a little more. The land in the intervening space between the plan of 1844 and the plan of 1848 became the property of the Dock Trustees through the intervention of the Corporation. It was purchased through the Corporation from Lord Derby. The deposited plan stopped short, I believe. The entire measurement of the land on the deposited plan of 1848 was 207 acres. It was intended to have a great timber float; the area of the timber float was to be about 51 acres; there was to be an entrance into that timber dock by a basin of 8 acres, 2835 yards is shown upon the deposited plan; two passages from the basin to the timber float; the whole object of that act was a cheap accommodation to the timber trade. The estimate of 1848, as far as I can recollect, was about 340,000*l.* We got possession of the land by reason of a contract for making the land which we know as the pink land; no money passed. If that work had been carried out it would have supplied the timber trade with a very cheap dock. At that time my own opinion was that it was sufficient; but better judges than I, that is, the timber trade themselves, consider not. The rent was calculated to be at 3d. a yard, according to Mr. Bramley Moore's evidence, as chairman of the Dock Committee, that was the first application to Parliament in reference to the moving of the timber trade. In 1844 it had been given in evidence by myself and my father that the south was much the best place for the site of the timber trade. I do not recollect giving evidence that the floats passing up the river, through the traffic, would be a very great obstruction and inconvenience, if the timber trade were removed to the north. I dare say I did. That was an opinion entertained not only by myself but generally by persons connected with the timber trade, and by

J. B. Hartley, 29 Mar., 1855.

Plans of 1848.

J. B. Hartley, 29 Mar., 1855.

the engineers examined upon that subject; my opinion is still the same, that it will add to a certain extent to the inconvenience of the river. I cannot tell you what was done with the money raised under the act of 1848. I can only tell you what has been spent under our particular superintendence. About 150,000*l.* has been spent in my department upon the ground covered by the Act of 1848. About 66,000*l.* was spent upon the river wall; that includes the entrances. I cannot say in detail what became of the rest of that money. We have built the Huskisson Dock upon that land, nothing else. There are no graving docks upon that land. The graving docks to the east of the Huskisson Dock are part of the plan of the present year; we have spent upon the Huskisson Dock 244,833*l.* About half the east quay of the Huskisson Dock is appropriated to the Collins line of steamers; the remaining portion of the east quay is appropriated to the timber trade; and the west quay is entirely devoted to the Cunard line of steamers. You must ask the Dock Committee why they abandoned the plan of 1848. I do not take the initiative in anything of the kind. Our opinion was asked, in connexion with the wants of the trade, what was the best way of supplying it? The plan of 1848 was a mere rough float, for the purpose of discharging timber into the water, and pulling it on shore; the plan as now laid down before you is what may be called a finished design, applicable not only to the timber trade but to all the other trades as far as the quays will allow. We have been asked, and have given plan after plan to the Dock Committee, for the best accommodation of the timber trade, according to the various notions which were suggested to us at different times and during the time that the Committee sat which was appointed. I cannot tell you how many plans were laid before them, but they were very numerous, and this plan has been at last fixed upon as the best. The ground has been turned over in every direction; and plans have been made of various descriptions to see how we could do it without purchasing Lord Derby's ground; it was then found that we had not a depth of ground to give the accommodation which the trade required, and it was decided to purchase Lord Derby's ground. The Dock Committee have never consulted us upon the fact that they have received a communication from the Chamber of Commerce, to the effect that the attention of the Dock Committee be again respectfully called to the recommendations and suggestions made to them by this Chamber in its report and resolution of 30th of October, 1854, and that the Chamber "regrets that dock extension on a large scale should have been decided upon without (as far as it is informed) the whole question of the estuary, the docks, and the railway acccommodation connected therewith, having been submitted to the highest and most competent engineering talent." They have never consulted us upon the subject how the best accommodation could be afforded to the timber trade, having regard not only to the Lancashire shore of the Mersey, but also to the Cheshire shore of the Mersey. My attention

Expenditure under Act of 1848.

has never been directed by that Committee to the Birkenhead Docks in any instance. I believe there is an agreement with the Duchy that we are to come to Parliament within ten years from 1848, to enclose the blue land in such a manner as Captain Evans shall direct. The plan as it is now presented to the consideration of the Committee, was matured about the end of September. I did not consult with any engineer except my father. The plan was matured entirely by the Dock Committee; with the benefit of consulting myself and my father, and no other engineer. The Toxteth Dock is now chiefly used for the mahogany trade; that is the extreme south dock—it is a very small one; and there is a portion of the Queen's Dock used for the timber trade. Rather more than a quarter of all the quay space of the Huskisson Dock is devoted to timber. The Brunswick Dock was originally made with the special object of accommodating the timber trade. We are intending to lay the sills of the new locks at 7 feet 6 in. or 8 feet—we are going to try 8 feet—below the old dock sill; that is the datum from which the tides are all calculated at Liverpool. That will give over the sills at high water of the lowest neap tides, 17 feet; 9 feet being the minimum rise at neap tides, 9 and 8 are 17. The sill of the Brunswick Dock is 4 feet 6 in. to 9 feet, and the water 13 feet 6 in. against 17 feet.

J. B. Hartley, 29 Mar., 1855.

Cross-examined by Mr. Gregory.

Cross-examination.

Captain Evans is our only authority upon the river Mersey and the navigation. I conceive Captain Evans can stop at any time anything that he sees we are doing wrong. I have no doubt what he recommends is generally right. I have seen his last report upon the navigation of the river Mersey. I have not had a copy of it. I agree with the opinion—"From constant changes and attentive observation it appears that the changes now taking place in the sea channels are in some measure attributable to the unfinished state of the river walls constructing by the trustees of the docks on both sides of the river Mersey. Until those walls are finished in conformity with the plans sanctioned by Parliament, and so as not to stop abruptly as at present at right angles to the direction of the tide, there is but little hope of obtaining a permanent steady scour or a fixed channel for any lengthened period. I think there can be no question that the more complete we make our walls, the further they are carried to the north, the better will be the channel." We have come further out generally than the plan of 1847—about 100 yards further out. I do not know anything about the Act of Parliament beyond the general effect. It was proved in evidence before the Committee in 1848, that we had to make that pink land; it was to be made and filled up for Lord Derby as a compensation for the blue land that we were to get. The prevalent winds are westerly; that throws the sea upon that wall, and makes it rebound from that side. That tendency will be greater when the sea impinges upon a wall than

J. B. Hartley, 29 Mar., 1855.

when it impinges upon an open shore, inasmuch as the momentum of the tide will be increased by the wall itself. That tendency will not be increased the further the wall is carried. I think if we carry the wall further on you will get a more equal line of current; you will have the current running straighter up and down the river. I think the impetus of the tide coming up will more than overcome the tide setting in from the Rock Channel. I think some garden walls have been washed away, retaining walls, northward of Seacombe Point, from the insufficient manner in which they had been built; the earth and clay which is carried away from those banks goes up the stream. Perhaps it comes down with the ebb and deposits. It will be deposited at some time or other. That bank is clay. The wash is generally about the top of high water.

By the Committee.—Looking back at the past history of the Dock Estate or the Port of Liverpool, I think it would be prudent under all circumstances for the Dock Trustees to buy the yellow land upon the present occasion. I may state that in 1844, when the designs were made for coming to Parliament, we had before our Committee plans for extending or taking the land right up to the canal in that direction, and I think they have never regretted but once since, and that has been ever since, that they did not take powers then to take that land. The consequence has been that our docks have been obliged to progress northward. I think that is a sort of margin which it would be desirable for the Dock Estate to possess. If the Dock Committee should allow smelting works upon that property, it would be going to a class of business which hitherto has never been carried on by them. The reason the Committee's attention was drawn to that was from the numerous applications which they had for accommodation of that description upon one side of the water. I only allude to smelting as one of many descriptions of trade which require water frontage which no one can give them but the Dock Estate; for instance, there are carriers; the Nova Scotia property is now entirely occupied by carriers; if we take it and absorb it into the docks, we must find those parties some other place, or they must be driven away. They are parties who must have water frontage, and there are a great number of trades of the same description. The ore is ground now at the Harrington Estate, and they send it away when ground to be smelted, but it would be a great advantage if it could be smelted where it is ground.

Smelting and other trades.

Sir W. Cubitt, 29 Mar., 1855.

Sir William Cubitt, examined by Mr. Merewether.

I am well acquainted with Liverpool and the docks in the Mersey. I have known Liverpool generally about forty-five years. I designed the old landing stage there, and am making the new one. The first was for the Dock Committee; the present landing stage, which is twice the length of the first one, is for the Corporation. It is about 1000 feet in length, as shown in front of the Prince's Dock. I am acquainted with the crowded state of the docks and the necessities of the trade

there. I have very recently found them so crowded that there was not room for another vessel. I have considered the plans for dock extension. Taking the extra room, which will be necessary, I deem the present plan a most judicious one. I have had considerable means of forming an opinion upon the capacity of the Messrs. Hartley as engineers. I know their great experience in that line of the profession, dock-making and river works especially, and they have also done works for me at Liverpool of a similar kind for the Bridgewater Trust Estate, in building a river wall and forming entrance locks to the present works. I am quite aware of their practice and experience. I do not think there are any two other gentlemen in the kingdom so competent and so experienced for that kind of work. In the year 1848 I was consulted, and gave evidence. I recollect the circumstance of the river wall being discussed; there was a demur with regard to the direction of the line of it on the part of the opposition to the Bill, and the subject was then discussed, and the parties went to the Admiralty; Captain Evans, I think, and one or two others were there; the subject was afterwards discussed, on the 17th of April, I believe, in the Committee, and an arrangement was made as to the direction of the line, and whatever arrangement was made that day was confirmed the next day by the passing of the preamble of the Bill. The direction of the line was settled by Admiral Beaufort and Captain Evans, and it was given in evidence in the Committee on that day, the 17th of April, and the preamble of the Bill, after that arrangement, was passed the next day. I have a perfect recollection of it. (*g*) I was professionally consulted by the Dock Committee with regard to this plan. I did not go through the calculations as to the quantities of the works, but I went through the plan as a plan first, and I highly approved of it. I have a firm persuasion and knowledge, I may say, that the plans, as proposed by Messrs. Hartley, can be carried out at the sum they have stated. I know that more particularly, from their having done certain works for me at the same prices, in 1847 or 1846, for the Bridgewater Trust.

Sir W. Cubitt, 29 Mar., 1855.

Cross-examined by Mr. Calvert.

Cross-examination.

I was first consulted about this plan, I think it was, after the plans were deposited. I do not recollect that my opinion was asked whether dock accommodation was or was not required. I can give you my opinion upon that subject if I am asked. I know it was required and is required. My opinion has been asked whether the traffic in the Mersey, coming to the port of Liverpool, requires accommodation beyond that which is already existing on the Lancashire shore and that which is projected upon the Cheshire shore. I am acquainted with the projected Birkenhead works. I gave evidence in 1844 in favour of

(*g*) See Proceedings before the Committee of the House of Commons on the Dock Bills, 18 April, 1848, Webster, p. 59.

Sir W. Cubitt, 29 Mar., 1855.

them, and I should still if the same plans were to be carried out. It is my opinion they would do what Mr. Rendel proposed. I do not know, in taking into consideration the wants of the port, that the works projected at Birkenhead are overlooked. If the Birkenhead works were carried out immediately, all that is proposed to be done here, I think, would be necessary. I gave evidence for the Bill of 1848, and in approbation of the plans. There were no works then marked upon the ground which is now the subject of inquiry. Part of the present works, projected by Mr. Hartley, are upon the blue ground, but there were other works not upon that ground, but upon other ground, in 1848. I have forgotten whether the works were upon the same ground; if so, I think the present plans apply more to the nature of the present circumstances and meet the present wants; the wants now are different from what they were then.

Cross-examination.

Cross-examined by Mr. Gregory.

With reference to this arrangement between the Dock Trustees and the Admiralty in 1848, the consultation took place at the Admiralty with the hydrographer and Captain Evans, and there may have been some others. My belief is, that the wall as it is now built is in the line which was then arranged. I was here when Mr. Hartley was examined. I do not know that he said there was a difference of 100 yards in the direction of the river. My belief is that the original line, which was settled with the Admiralty, has been carried out. The line of the wall at present is not the line laid down in the deposited plan before Parliament; of that I am quite aware. The present wall is in advance of the plan which was settled by arrangement in the Committee the day before the preamble was passed, but I do not know that it is exactly 100 yards in advance of that line.

Re-examined by Mr. Merewether.

Circumstances are very much altered since 1848; the plans now proposed suit the present wants more than the plans of 1848 did.

Friday, 30th March, 1855.

THE RIGHT HONOURABLE HENRY LABOUCHERE IN THE CHAIR.

Mr. Merewether, in reference to the evidence of Sir Wm. Cubitt, yesterday, read the report of a correspondence with the Admiralty, as laid before the Committee on the Act of 1848, (*h*) and referred to the Mersey Conservancy Act (5 & 6 Vict. c. 110), whereby a special jurisdiction and tribunal was provided for all works in the Mersey.

Captain George Evans, R.N., examined by the Committee. *Capt. G. Evans, R.N.,* 30 Mar., 1855.

I am acting Conservator of the Mersey, under the Act of Parliament. I am officially appointed by the three Commissioners of the Conservancy, viz., the First Lord of the Admiralty, the Chancellor of the Duchy of Lancaster, and the Chief Commissioner of Woods. Nothing goes to the Commissioners without my having first consulted the hydrographer of the Admiralty, and obtained his perfect consent and concurrence in the views I represent to the Commissioners; that is done that the First Lord of the Admiralty may not be placed in a position to express an opinion as Conservator, and afterwards have to express a different one as First Lord of the Admiralty. I never go before the Commissioners without having first consulted the hydrographer, and having got his perfect consent and approval to anything that has to be laid before the Commissioners. I then state to the Commissioners I have done so, and the order goes out. If anything particular affects either of the departments of the other two Commissioners, I should bring that matter before that Commissioner; if anything affected the rights of the Duchy of Lancaster, I should bring that point before the Chancellor, and the Commissioners of Woods likewise. I may explain why these three were appointed. It was, that the Chancellor of the Duchy of Lancaster represents the Crown in right of the fore-shore on the Lancaster side of the river, whereas the Office of Woods represents the fore-shore in right of the Crown along the Cheshire side of the river, and then the First Lord of the Admiralty is paramount as to the navigation of the river, and each of the three boards has its own staff to consult with on any occasion. I have never found any practical inconvenience in acting on behalf of three bodies, which may have separate, if not contradictory interests in some respects, and for this reason: the Lord of the Admiralty is perfectly neutral, he has nothing to do with the land upon either side; the Chancellor of the Duchy of Lancaster has nothing to do with the land on the Cheshire side, and the Commissioner of Woods has nothing to do with the Lancashire side, therefore, there are two to one. There

(*h*) See Evidence before the Committee of the House of Commons on Liverpool Docks Bill, 15 April, 1848, Webster's Report, pp. 58-9.

Capt. G. Evans, R.N., 30 Mar., 1855.

never has occurred any inconvenience, but if there were, there would be a majority of two to one to protect the public.

The alteration in the river wall was made with my full knowledge and consent; on consultation with Admiral Beaufort—I think it was Admiral Beaufort who drew the line—I took the maps and plans to the hydrographer. The plans, by the Act just referred to, are first sent to me; they do send them also to the Admiralty, but they are first sent to me, and they must give me two months' notice before they can do anything. The moment I get them, I go to the hydrographer of the Admiralty, and we discuss the merits of those plans, and come to a conclusion as to what ought to be done; and having got his perfect concurrence, or obtained his views, which may be sometimes different from my own (but I was always very glad to get the opinion of Sir Francis Beaufort), I then go before the Commissioners with the opinion of Sir Francis Beaufort, and my own humble opinion added to it, and the Commissioners then of course approve of it, the object being, that there should be no collision but that everything should go smooth and clear. This actually took place in reference to this line of wall. In fact, in the plan the line is drawn as approved of by the Admiralty. We consider the Admiralty to be in fact the Chief Commissioners of the Conservancy. I think Admiral Beaufort altered the line of the original plan to Crosby Point. He brought it out a little; I think I can speak confidently upon that; he altered the plan which was put in by the promoters of the scheme, so that it should come straight to Crosby Point. It brought it out a little more. It was the suggestion of the hydrographer and mine together, that the further encroachment upon the stream was made; it was with the view of making the line straighter in connexion with the point, so that the tide should run straight along. The existing line is in an exact direction for Crosby Point; there is a part of it which is perfectly straight, and I have walked upon it and cast my eye along, and you know how easily you obtain, by looking along a wall, the point which it will abut on, and I have seen that it comes direct to the point; it is rather inside the point. For the sake of the navigation of the river, I contemplate its being necessary as a further step, to carry on that sea wall in a direct line to Crosby Point; and I think you will find that we objected, but still as it was only a temporary thing and part of a great scheme, the Admiralty allowed them to go on; if they meant to stop, they would never be allowed to stop in that way, with the wall at right angles to the stream. I do not think that abrupt termination of the sea wall has had much effect in setting the tide over to the Cheshire shore, but the tide from the Rock Channel takes off the effect of that offset. I think I can show you that also by reading a paragraph from the report of my predecessor, Captain Fitzroy. This was written by him in January, 1843, being the first and only report upon the river Mersey for 1842, long before any northern docks were thought of between Woodside and the Rock

Alteration of line of river wall.

Extension to Crosby Point.

Lighthouse; there are several places where the loose sand and soil are permitted to waste away and mix with the water unrestrained, and assuredly this should be prevented where practicable, without incurring too great expense, by walls, piling, or an embankment; so that from that time all that friable stuff has been washing away, and even the tide has got to the hard marl, and that is coming away. That these works may affect it in some measure is true, for the object of these walls was to throw a greater quantity of water into the river Mersey than before. You have six hours of tide, and during those six hours, if you shape the entrance of the river so as to admit the greatest possible quantity of water to go up, the result is that there will be an accumulation of water at the gorge, the centre part, which is just opposite the place to which these gentlemen refer, or perhaps a curve forming nearly a versed sine of two feet, and as that increases it will produce the effect those gentlemen speak of at the other side. The more that is washed away the better for the Commissioners of Woods and Forests. If nature washes away a man's land it becomes the property of the Crown. On the other hand, if nature silts up one hundred acres in front of your property, it is your own though it belonged to the Crown before. *Capt. G. Evans, R.N.*, 30 Mar., 1855.

By Mr. Merewether.—The existing wall, as it stands at present, has the approval of the authorities to whom I have referred.

By Mr. Serjeant Wrangham.—They are always submitted to me the first thing; I cannot tell you exactly the date when those plans were submitted to me. The plans before they come to Parliament are generally sent to me. It was the deposited Parliamentary plan which was laid before me and approved of by me, with the proviso which is in every Bill, I believe, certainly in every Bill that I have had anything to do with as Conservator, that it shall be subject to revision afterwards by the Conservancy, which is the Admiralty; in this case the Conservancy and the Admiralty are one and the same body, the First Lord being at the head of the two; he corrects me upon the one side, and the hydrographer on the other, and he consults us both. My evidence to the Committee was this. I was the humble individual who submitted the plans to the hydrographer individually and took his advice. All meetings held by the Commissioners of the Conservancy are held at the Admiralty in the First Lord's room, and that whenever a question of this sort arises, I generally ask permission of the Commissioners to have Sir Francis Beaufort in the room, but being in the Admiralty, they have only to ring the bell, and they have everybody in the Admiralty to consult upon the subject in case it is necessary. I am only what may be called an offshoot of the hydrographic department of the Admiralty, to give them the local information which they may require as to the Mersey, to guide them. I think there was a deviation made afterwards in the line of the deposited Parliamentary plan of 1848. I may explain that it is quite necessary that the Admiralty should have a discretionary power in altering the line of the river wall; and a very Mersey Conservancy Board.

Capt. G. Evans, R.N., 30 Mar., 1855.

strong case occurred at Birkenhead. According to the original deposited plans the line of wall was straight from Seacombe to Woodside, but in consequence of a representation from Mr. Rendel to me, that he would be at an enormous expense in piling, there being no foundation, if he was to make a straight wall, and that it was necessary for him to go in and make a curve precisely similar to that which you see there, he was permitted, after the deposited plans, to make a deviation, that shows the necessity of having this power—that is, only to show the necessity for having these clauses, you must make a deviation at times. As to dates, I am sorry to say I cannot inform you. I recollect very well that the great strain which was laid was the continuation of the river wall to Crosby Point, and that the first part should be so laid as to allow of a continuation straight to Crosby Point, that being the great object of the Admiralty. Whatever the discussion was, it took place during the session of Parliament, while the Bill was travelling through Parliament. This is the plan then submitted, and this is the plan now in existence. No other plan has been submitted to me since this one. Whether it was before or after the Bill went to Parliament, this is the final plan agreed on. This is the plan which has been carried out; I know nothing of any other since this was the final one. We might have approved of fifty before that and then altered them. This is the final plan, Admiral Beaufort drew the line, and this is the one I am saying I carried out. Whether upon this the letter was written by the Admiralty to the Chairman of the Committee upon the Bill, I cannot tell. I have nothing to do with the Admiralty letters; as to dates and letters I know nothing about them. The letters A to D were put on at that time; the sections were altered afterwards, I think they had three at first, then they wanted to make it in four lengths, and it was granted to them. That was a matter between them and the Admiralty; I think the letter expresses that. I identify the line by standing on the wall and seeing that it goes quite to Crosby Point.

Extension of wall to Crosby Point.

By Mr. Gregory.—In 1848 I had the deposited Parliamentary plan, which Parliamentary plan has been altered to the one before me. I never saw that tracing till to-day, I think; I do not know anything about it. I might have had fifty plans subsequent to the Parliamentary plan. I can only tell you that this is the final plan agreed on, and this is the one now being carried out, and this it is my duty to see carried out. I cannot tell when that plan was submitted to me without reference to books in the office. It has been in my office. I fished it up the other day. It was brought to me, I suppose, by Mr. Hartley. I cannot tell you exactly who brings the plans to my office. It is one of Messrs. Hartley's plans, in 1848. All those plans, when sent in, are subject to any little alteration in the line of the river wall as carried out. This is the plan of the Liverpool Docks, by Messrs. Hartley, in 1848. The Conservancy has nothing to do with anything but the yellow line you see there. We have nothing to do with the interior arrangements. That yellow line was laid down by me and Admiral

Beaufort. It has written upon it, "Approved by the Admiralty." My duty now is to see that that line is carried out. I did not say that the more the land is washed away the better, inasmuch as it would become the property of the Crown. I was asked what interest the Crown would have, as if the Crown were to build the wall. I told you the Crown would not care much about the land being washed away. I have looked to the washing away of this shore in reference to the navigation of the river, and called the attention of gentlemen to it every year since I have been acting conservator, hoping to get them to construct a wall on the Seacombe side. I have had interviews with almost all the gentlemen. I consider that important for the navigation, I do indeed. It comes now to a very stiff marl, and every bit of that which is washed into the river is pernicious. Nobody can fix its place of deposit in such an estuary as the Mersey. Such millions and millions of tons of sand are held in suspension in a gale of wind, that nobody can trace it.

Capt. G. Evans, R.N., 30 Mar., 1855.

Wasting of land at Seacombe.

By Mr. Merewether.—Whatever plans may have been introduced before the Bill was in Parliament, in 1848, or whatever plans were introduced during the time it was in Parliament, the one now produced is the final plan, agreed on by the authorities, and the wall has been executed and stands according to that plan.

The Committee-room was cleared.

After a short time the counsel and parties were called in and informed that the Committee would adjourn to Thursday, the 19th of April.

The Chairman stated that, speaking in his own individual capacity, and not on behalf of the Committee, he wished to convey to the parties that, having heard that negotiations had been going on between them, and that it was possible an agreement might be come to by which the interests of Birkenhead and of Liverpool should be united, he should himself rejoice to learn that the contending parties had come to such an agreement on equitable terms, because be believed that such an agreement would not only save great expense, but would also be for the public advantage.

Amalgamation of Birkenhead and Liverpool.

Thursday, 19th April, 1855.

THE RIGHT HONOURABLE HENRY LABOUCHERE IN THE CHAIR.

Objection to further progress of Bill

Mr. Serjeant Wrangham objected to the further progress of this Bill, on the ground that the estimate which had been deposited under the Standing Orders for the sum of 1,590,000*l.*, had been shown, by the evidence of the promoters themselves, to be insufficient to carry out all the various purposes which must be taken to be included within the "undertaking under the Bill;" and also on the ground of the insufficiency of the declaration of surplus.

Mr. Hope Scott was heard in answer to the objection, and submitted that, under Standing Order 119, the objections raised by Mr. Serjeant Wrangham might have been inquired into by the Examiner of Petitions for Private Bills, and, therefore, could not be inquired into by the Committee on the Bill.

Mr. Serjeant Wrangham was heard in reply.

The Committee having deliberated, decided against the objection.

Mr. Gregory was heard in opposition to the Bill on behalf of owners of property at Wallasey, and stated that as the witnesses whom he should call would have to be called upon the general case, he would, with the permission of the Committee, take an opportunity of putting such questions to them, when they were so called, as he thought necessary for the support of his case.

Charles Holland, examined by Mr. Hardy.

C. Holland, 19 April, 1855.

I come here having the alternative given me that a Speaker's warrant would be applied for if I did not come. I thought it perfectly unnecessary to put the gentleman to that expense, and therefore I assented to come. My objection was, that as Vice-President of the Liverpool Chamber of Commerce, I did not think it my duty to come as a witness for either side. The Chamber of Commerce comprehends about five hundred of the merchants of Liverpool. There is a Council composed of twenty or twenty-one members, elected by the members of the Chamber by ballot; and there are ten or twelve additional Council members representing the different associations of the other respective trades in the town which are associated with the main Council of the Chamber. The objects of the Chamber are to look after the interests of the trade and commerce of Liverpool. This proposed scheme of dock extension came before the Chamber of Commerce at Liverpool on the 2nd of August in last year. It was considered by the Council of the Chamber, and they appointed a special committee to investigate the plans of the Dock Committee, and to report to the Council. The special committee reported briefly on the 23rd of August, but they said they had not had time to

Chamber of Commerce at Liverpool.

make a full report; that report was considered by the Chamber on the 31st of August. At the half-yearly general meeting of the Chamber the Council themselves made a full report to the Chamber at large upon the subject, upon this particular plan which had been submitted by the Dock Committee to the Council. All the plans were investigated by the Council. On the 31st of August the following resolution was come to: "That the Council be requested to continue its attention to the subjects arising out of the dock extension scheme, and to report to the Chamber as soon as possible." On the 31st of October there was a special general meeting of the Chamber to receive the following report of the Council: *C. Holland, 19 April, 1855.*

"Your Council have fully considered the matter referred to them, but they are of opinion that, in order to form a correct judgment on the questions of detail in the proposed scheme of dock extension, it would be necessary to have the best advice upon them from practical engineering knowledge. This, of course, your Council are not in a position to command, and they have, therefore, confined their attention to the consideration of the wants of the trade of the port and of the public, believing that increased dock accommodation is urgently required, and that it devolves upon other authorities to consider the best means of meeting the same.

"In order to the perfect working of the docks, your Council are of opinion that a thoroughfare north and south should be kept entirely free, and that no warehouse should be erected which would at all interfere with such complete communication; and, apart from the important extension and improvements now proposed, they would strongly recommend a revision of the working of the docks generally, so as to afford opportunities of introducing mechanical and scientific appliances whereby time and space may be economised in the loading and unloading of ships, and that all possible measures and precautions should be taken to prevent damage to goods while on the quay, the occasion of which has already an injurious effect in several branches of the export trade. Considering the increasing competition of London, Southampton, and other large ports for the conveyance of the more valuable products of British manufacture to all parts of the world, it cannot be too strongly impressed on the mind of the Trustees of the Dock Estate that the difference in the aggregate charges and freight of goods of even two shillings or three shillings per ton, or the difference of the packages being shipped in a dirty or clean state, may have the effect of withdrawing from Liverpool further large portions of the export trade which her natural position has hitherto secured to her; your Council deem it expedient, while referring to the export trade, to call attention to the report of a special committee on this subject, which they transmitted to the Dock Committee in March, 1852, and they would recapitulate the principal suggestions therein contained for improvement in the dock arrangements." Then follow a great many suggestions as to sheds, the best mode of loading

Report to Chamber of Commerce.

Competition of other ports.

C. Holland, 19 April, 1855. *Report to Chamber of Commerce.*

goods, and so on; the better arrangement of the quay sides, such as the erection of wooden platforms, the supplying of suitable tents to protect the goods, a better arrangement of the hydrants for supplying water to ships, the appropriation of sheds for goods in bond for export, the supplying properly constructed stages and trucks, &c. &c. &c. The large amount of the export trade now from Liverpool is alluded to, the amount being 91,000,000*l.* for the whole kingdom, of which Liverpool exported 47,000,000*l.* It says the suggestions above enumerated are under the consideration of the Dock Committee, and although only a very small part of them has as yet been carried out, your Council hope that, as circumstances may admit, the others will be adopted also. Then coming to the new scheme of the Dock Committee, the resolution which we came to on the 30th of October was: Resolved,—"That this Chamber, concurring in the view taken by the Dock Committee as to the vital importance that ample dock accommodation should be provided to meet the increasing wants of the commerce of the port, considers that the magnitude of the commercial and other interests bound up in the prosperity of Liverpool requires the broadest and most unprejudiced views to be entertained of the measures proposed for the maintenance of that prosperity, and that the great extent of the shores of the estuary, and the difficulty of rightly appreciating the force and influence of tides and winds as modified or augmented by artificial embankments and constructions, call for the greatest caution and deliberation before any steps be irretrievably taken which may have an adverse effect on the capacities of the port, this Chamber, therefore, strongly recommends that means be taken for obtaining the opinions of the highest engineering talent of the country, not only in respect to the selection of the best sites for dock extension, and the construction of the new docks, railroads, and improved communication with the interior, as well as the numerous details embraced in the Dock Committee's report, but also in respect to the effect which the present or proposed line of dock quays and embankments may have on the channels and approaches of the estuary of the Mersey."

Resolution on proposed scheme.

That report and resolution were forwarded to the Dock Trustees on the the 6th of November. The following letter was received from the Dock Secretary's Office, dated the 18th of November, addressed to the Secretary of the Chamber of Commerce:—"Sir, I am instructed to acquaint you, for the information of the Liverpool Chamber of Commerce, that the copy of the special report from the Council to the members of that body, on the proposed dock extension scheme, enclosed in your letter of the 8th instant, addressed to the chairman of the Dock Committee, was laid before the Committee at the meeting, and after having been read, was referred to the sub-committee of the works for further consideration. I was directed to assure the Chamber of Commerce that the Committee will at all times give their best attention to

Letter from Dock Committee.

any representations which the Chamber may lay before them. With regard to suggestions on dock arrangements and improvements, contained in a report dated March, 1852, they have continued to receive the attentive consideration of the Committee, and the statement accompanying this letter will show the improvements which have already been carried into effect. The Committee will from time to time proceed with other improvements of the docks, as the extension of the commerce of the port may require.—I am, Sir, your obedient servant,—Daniel Mason, Secretary." At the last half-yearly general meeting, on the 5th February, it was resolved unanimously, "That the attention of the Dock Committee be again respectfully called to the recommendations and suggestions made to them by this Chamber, in its report and resolution of October, 1854, and that the Chamber regrets that dock extension on a large scale should have been decided upon without (so far as it is informed) the whole question of the estuary, the docks, and the railway accommodation connected therewith having been submitted to the highest and most competent engineering talent." That was ordered to be presented to the Dock Committee by a deputation; I attended with that deputation. We met a very full board of the Dock Committee on the 15th February. I stated as nearly as I could the sentiments which were entertained by the Council of the Chamber on the new dock scheme. I stated the general grounds on which the Chamber gave that strong recommendation for the further inquiry, and likewise the special reasons which they had added to the general question. I stated that the general grounds the Chamber took were these: That it was exceedingly important that such a very large outlay as it was then contemplated committing them to for an extension of the docks so far north should not be proceeded with, unless indubitable evidence were adduced of high engineering talent, that, that locality was the one best suited to the wants of the trade in the river Mersey; that it was no slight matter to augment by nearly four millions the bond debt of the Dock Estate, without having that engineering authority to go on; that we did not find such talent had been employed, notwithstanding our previous recommendations that it should be. Those were the general grounds of objection. The special objections which were raised before the Council I will now refer to. They were, first, that the elongation of the present system of docks—the continuous extension to the north—as contrasted with centralisation, was of itself decidedly objectionable, if it could be avoided; secondly, they objected, that although dock accommodation appeared to be urgently required, yet, seeing that the Dock Committee already have power to augment the dock space by upwards of 100 acres for which they have the land, it did not appear to the Chamber that such a precipitate step should be taken at present, but they thought the time would allow of further engineering evidence; that if they constructed

C. Holland, 19 April, 1855.

Resolution of Chamber of Commerce.

Meeting with Dock Committee.

Augmentation of bond debt.

Land at present available.

C. Holland, 19 April, 1855.

the works under the Act of 1848, for all which they had ample powers, there would be an increase of 50 per cent. over their present dock accommodation, which would therefore suffice for immediate wants; thirdly, that special objections had been raised before the Council, particularly by those members of it who had an opportunity of crossing the river daily, among whom I may name myself, that the navigation of the river, and the approaches to the river, the access to the docks, in fact, were likely to be most prejudicially interfered with by the completion of the present north wall now in the course of erection. The evidence which was notoriously given by American captains and other captains was that the present access to the north docks was objectionable; that doubts were entertained as to the depth of water in approaching them; that if, consequent upon the acknowledged detriment which the river was receiving by reason of that north wall being erected, that north wall should have to be pushed back from its present line, the access to those docks would be, pro tanto, damaged, and the depth of the water decreased; and to go and make an investment in land of 700,000*l.* and upwards, internal and to the east of those docks, with that problematical contingency before them, was another objection which ought not to be lost sight of. Having stated those objections generally, we then pointed out that the Council thought that there might be other localities in the river which would afford less objectionable sites, and furnish all the dock accommodation which was required by the trade. I adverted to Birkenhead as being one site. Without pressing Birkenhead, for obvious reasons, upon their consideration, I also adverted to the fact that they would be compelled to build a wall parallel to the present wall, to preserve the navigation of the river. Dock space might arise from the construction of that wall. I believe I went into some other matters which will appear in the paper. Those were the general features of the grounds taken by the Council for recommending, and urgently recommending, that, prior to such a large investment in land,—former investments which had been made by the Committee having been fatal to their interests, inasmuch as they had already got an investment at the south, and which involved an annual loss to them of eleven thousand pounds,—they should pause, and be content to get power to raise money to construct docks on the hundred and odd acres which were now in their hands. There were other gentlemen in the deputation who entertained very strong opinions about a high level railway for working the already extremely elongated series of docks in Liverpool, and they pressed that particular plan of the high level railway, independently of my general remarks, which I believe contained all the Council thought necessary to say. We heard that at that time negotiations were going on for the purchase of Birkenhead, and we thought it unfair to all parties to say anything about it. We thought it might be unfair to the Dock Committee to express opinions which might put them in a worse posi-

Objections to northern entrances.

tion in making their bargain. I have not the slightest interest in Birkenhead. I am not aware that any gentleman on that deputation had the slightest, except that I have heard that Mr. Littledale, who, I believe, is present, had a dock bond for 200*l.* or 300*l.* The injury to the river from the effects of the works had caused a good deal of discussion among those gentlemen who, living upon the Cheshire side of the river, had daily evidence presented to them of the effects of the wall. I stated to the Dock Committee, and it was not contradicted, and I believe cannot be contradicted, that whereas, in the year 1844, Captain Evans, the conservator of the river, warned the Dock Committee of the enormous injury to the navigation of the river consequent upon the 213,000 tons of silt, which is now or was then entering from the river and deposited in the docks, and then retaken from the docks and put into the river,—in our judgment there must be an equal amount now deposited, not of silt from the river, but of new clay from the bank, in consequence of the tide washing it away on the Cheshire coast, and it was for them to judge of the damage which would accrue. I should say that every man whose land is washed away is injured, and the river is injured pro tanto. The chairman of the Dock Committee was present when I made this statement; he made a very courteous reply to the deputation, stating that most of the matters which they had brought before the Dock Committee had had their attention, and that the whole subject which they brought before them would have the fullest consideration of the Dock Committee; that as regarded the estuary, and navigation of the river, the Dock Committee had no power and no responsibility outside their dock walls. That is the only communication which we have had from the Dock Committee. My attention has been called to the evidence of Mr. Smith here, to the effect that the Council were satisfied that there had been some misapprehension as to the plans. We had no misapprehension about the plans; we had the plans all before us, the same plans which are before this Committee. We had made ourselves fully acquainted with those plans before we went to the Dock Committee with that deputation. I believe that the Council of the Chamber of Commerce still retains the opinion that a further and more impartial inquiry is necessary to settle all the interests of Liverpool in reference to the docks; there has been no change of opinion whatever. Our resolution left the Dock Committee at liberty to examine all the river; we could not pretend to dictate to them, nor did we particularly point out any site. We called attention to the Cheshire side generally, and to Birkenhead. I should say it is very imprudent to ignore the facilities which the other side of the river offers for dock accommodation. I cannot commit the Chamber to anything more than their resolution, and the sentiments which I upon their part presented to the Dock Committee. If you ask me as to the feelings of the merchants of Liverpool, I should say I think a great many share that opinion. I would beg to limit myself to Birkenhead, where the natural advantages are notoriously

C. Holland, 19 April, 1855.

Warning of conservator as to deposits.

Further inquiry necessary as to Mersey questions.

Advantages of Birkenhead.

C. Holland, 19 April, 1855.

very great as regards the water-space which can be there acquired, and as to its being a central position compared with any extension in any other direction from the centre of Liverpool. Birkenhead would be called from the quays of the docks a mile and a half against, I should think, three miles; but taking it in time, the facility is greater from Birkenhead to the Liverpool Exchange, than from the extreme northern docks. You go the greater part of the way by steam in the one case, and by car in the other.

Examined by Mr. Gregory.

I am well acquainted with the portion of the Cheshire shore between Seacombe Ferry and Egremont. I live there. I have watched the wash of the shore there. I consider that wash has been very much increased by the Liverpool works. As the north wall is built up I consider it must necessarily increase the wash. The more the wall rises the more the tide will be deflected over to the Cheshire shore. There is some portion of this over which the sea flows now. The evidence adduced before the Admiralty engineer, Mr. Abernethy, in 1848, prior to his sanctioning that wall was, that the effect would be precisely the reverse of that which has been produced; that was the evidence produced by the Liverpool Dock Trustees, that it would benefit the navigation of the river, increase the scour, and preserve a uniform direct action of the stream up and down.

Wasting of the Cheshire shore.

Cross-examination.

Cross-examined by Mr. Merewether.

I have already stated that I come here rather compulsorily, but not on the part of the Chamber, not deputed by them. I told the chairman I was summoned. The Chamber is a body of about 500. I cannot tell you the number of the constituents of the dock ratepayers who elect half of the Dock Committee, but every man who pays 10*l.* dock rates is entitled to vote; I have no doubt, therefore, the number is very large. The chairman of the Dock Committee dealt with all the objections in detail, except the one question of the navigation of the river and the estuary, which he told us he could not look at, inasmuch as they had no power whatever to deal with it. He said they had no control over it. I do not think he went into the conservancy question. He might have pointed out that it was under the Lord High Admiral, the Chancellor of the Duchy of Lancaster, and the Woods and Forests. He might have informed us that it was not contemplated by the Trustees to execute any work under this Bill affecting the estuary; I do not recollect that he said that—what struck me, and what I bore in my memory was, that he could not deal with that part of our resolution. I do not know as a fact that there are no works proposed by this Bill which in the least degree affect the estuary. I am told part of the works do affect it, as regards the small portion of the red space. I reside close to New Brighton; my property extends to the foreshore;

Control over estuary.

120 yards foreshore with land at the back; Mr. Littledale has a large piece of land in Wallasey parish. I did not refer to the Act of 1844 at all. In 1848, Mr. Abernethy came down, prior to deciding whether the wall now erected under the Act of 1848 should be sanctioned or not. No engineering talent, that I am aware of, was then brought before him. The evidence in 1844 did not affect the wall which had produced the effects I deprecate; that is my impression. *C. Holland*, 19 April, 1855.

By the Committee.—I believe the Chamber of Commerce, with its Council, to represent pretty fairly the commercial community at Liverpool. I did not say that the Dock Committee, elected as they were, also might be taken to represent the commercial feeling of Liverpool. I merely said it was very likely that there might be 1700 parties paying dock rates who had a voice in electing one-half the Dock Committee. I should think that a fair representation of the shipping interest of Liverpool. I think it would be desirable that the facilities for the formation of docks on the Cheshire side of the river should be made use of, if engineers state that they could be advantageously made use of. Whether, that being done, it would be advantageous that all the docks should be under one management, is a large question; as a general question, I am in favour of competition, but I think in this case they might be all advantageously under one management, provided that the management was one of a public nature, which it is. I have never been connected with the management of the Dock Estate. I am a native of Liverpool, and an elector of the Dock Committee. I have voted once or twice; but I believe generally there is very little interest taken in the voting. I think, in all probability, the Dock Committee will nearly all of them be members of the Chamber of Commerce, not of the Council. I do not recollect, at this moment, whether any of them are members of the Council; but I think not, because in general they resign as members of the Chamber of Commerce if they are elected to the Dock Trust. Mr. Shand, who is vice-chairman of the Dock Trust, is a member of the Council, and was one year the president. I was not aware what Sir William Cubitt was consulted about till I saw it in evidence before this Committee. I do not know at what time he was consulted. One management for all the docks.

Re-examined by Mr. Hardy.

I wish that there should be a Commission of Inquiry which should call in independent and impartial engineering talent to consider the whole question of dock accommodation and the estuary also; that was, of course, the object which we had in view, not being confined to the engineers of the locality, but that it should be on the spot. My property is very contiguous to New Brighton, within a quarter of a mile of it; that is, three and a half or four miles below Birkenhead, by the sea. It is not in any way connected with Birkenhead; it is in front of that sea wall on the other side. My business pays pretty largely to the dock rates. I have a large property within the borough of Liverpool. Commission of Inquiry.

C. Holland, 19 April, 1855.

Re-examined by Mr. Gregory.

My foreshore is not affected by this wash which has been spoken of; the tide is deflected over a considerable angle from that projected north point, and does not hit my shore; it hits the shore higher up. I have no interest in the washing away of the land. The evidence of 1848 appears to have been expressly given upon the effect of this new sea wall; Mr. Abernethy was sent down expressly for that object by the Admiralty.

Land gained by building a wall.

By the Committee.—Should a parallel wall be built on the Cheshire side of the river, opposite to the present dock wall, there would be a considerable space very probably gained behind that wall which might be available for dock purposes; it was a mere suggestion which was thrown out among others—the engineers may find out various localities which would suit better. The resolution of the Chamber was made so wide, in order that the whole question of dock accommodation in all its aspects should be taken into consideration by the Dock Committee, not simply in an engineering point of view as to the best mode of making docks, but as to the best mode of providing increased accommodation for the trade of the port generally. Speaking individually as a practical merchant, I should not have deemed the question rightly dealt with if the question of dock accommodation on the opposite side of the river should be altogether ignored in carrying out this increased dock accommodation. As a man of business, looking to the increased accommodation of the port of Liverpool, I should not have ignored the question as to what could have been got at Birkenhead. The Conservancy Act of 1842 specifies that the Town Council of Manchester, the Town Council of Chester, and the Duke of Bridgewater should be supplied with plans. I do not know whether the Corporation of Manchester has been supplied with those plans. I have no connexion with Manchester whatever. The British Association met in Liverpool last year. I think there was some paper read about the estuary of the Mersey, as to the danger arising to the navigation, from a change in the tidal currents, which I did not myself see, but they appointed a Committee to deal with it; I think Lord Harrowby was appointed chairman. I have not seen or heard of any report.

Inquiry as to dock accommodation generally.

G. Warren, 19 April, 1855.

George Warren, examined by Mr. Calvert.

I am a member of the firm of Messrs. Rayne and Co., carrying on business between Liverpool and the United States. I have been in the room while Mr. Holland has been examined. I heard Mr. Holland express an opinion that there ought to be more inquiry before any extensive measure, such as that now before the Committee for dock accommodation at Liverpool, was carried out. If this scheme for investing a further sum of four millions in the increase of dock accommodation at Liverpool were to be carried out, it would decide the question as to further dock accommodation in the Mersey generally for a long time. Under these circumstances, I think there ought to be more inquiry; also for the reason

Proposed scheme decisive as to future accommodation.

that the inconveniences under which we labour are matters of notoriety. I do not think, at any rate I am not aware, that the means by which it is proposed to obviate them are either apparent or satisfactory. Those inconveniences apply particularly to the north docks, so called. I presume it is to a greater or less extent connected with the fact of the docks being on the lee shore; the particular inconvenience, however, arises from a want of water over the dock sills. Very great inconvenience is felt arising from that circumstance; it is a matter of every-day occurrence. Our business has necessarily some ships which are the very largest which come into Liverpool—I say necessarily, because no others will pay, carried on in American ships of the largest class; for the reason that there is so much competition now, we cannot do business in ships other than those which will live on three-eighths of a penny for a cotton freight—a freight of cotton at three-eighths of a penny. We cannot do business satisfactorily with vessels of a smaller size than those which can live on such a freight. The three-eighths being a low freight, we require to bring a very large cargo; besides that, a large vessel does not require so many men to man her in proportion. By means of mechanical appliances, such as improved capstans, double topsail-yards, and other things, we get on with a smaller number of men in a large vessel in proportion than in a small one. I have a vessel in the dock now which carries 5300 bales of cotton, which we man with only 22 men before the mast; that vessel competes advantageously with a smaller vessel which does not carry so much cargo, and which requires more than half as many men, and the same number of officers, obtaining nearly the same remuneration. Those facts necessitate a large class of vessels, and therefore I think we require a draught of water commensurate with the size. We cannot get on with less than 20 feet; we ought to have 25, and if we can get 30 so much the better. I have a vessel here now, the Star of Empire, which arrived here on Good Friday, drawing 21½ feet of water; that vessel could not dock on that day, not only because there was not water enough—the tide-table gave water enough—but the north wind, which always affects the tide, particularly as you approach the north, drove the water away, so that there was not so much water as the tide-table gave. I heard that that ship, which arrived on Good Friday, with a very valuable cargo, mostly guano, could not dock for nine days afterwards; during that time the vessel lay in the river, subjecting us to the loss of the vessel's time, which we estimate at a high value, and the consignees to the loss of interest upon the cargo. Had there been a dock with sills having 22 feet of water upon them, we should have been able to save all that inconvenience. I understand that we shall have more water at Birkenhead. I should be in favour of any measure which should accomplish the object of affording more water, and against any measure which should retard our obtaining that object on the Cheshire side; my particular object is to obtain more water; that is really the first object of the trade. A vessel grounded on the dock sill of the Wel-

G. Warren, 19 April, 1855.

Large ships essential.

Necessary depth over the sills.

Greater depth of water essential.

G. Warren, 19 April, 1855.

lington half-tide basin a few days since; she was attempting to dock, and broke her back. I saw the vessel, and was informed by the captain that she was leaking; I knew the captain, and have done business with him; she was there over one tide. Any interference with the flow of the tides is objectionable; there is nearly a similar case near us in Boston.

Encroachment on tidal estuary.

It has been a vexed question for a long while. There is a place called East Boston, situated somewhat similarly to Birkenhead, and another place called South Boston, being a peninsula making off from the mainland. There has been a continual encroachment upon the tidal water in Boston, for the sake of obtaining more accommodation; that has been followed by filling up the channel to a greater or less extent, so that the pilots observe a marked difference between the depth of water which there is there now and which there was some years ago. It has been a subject of legislative inquiry; a great deal of engineering and other talent has been brought to bear upon it; both the State Government of Massachusetts and the General Government at Washington have instituted commissions of inquiry into the matter, and the general result at which they have arrived is, that there shall be no more encroachments upon the flats over which the tide flows.

Cross-examination.

Cross-examined by Mr. Merewether.

By taking the Star of Empire to Birkenhead we should have been subjected to twice the amount of dues; and we were not at liberty to land our cargo there. The bills of lading state that the cargo shall be delivered at Liverpool; parties would not receive it at Birkenhead; if they would receive it, we should be very glad to give it to them there, at any time. If the consignees of the cargo of the Star of Empire would have received it at Birkenhead, they should have had it ten days ago. I do not know, whether there were 24 feet water where the vessel grounded—there should have been more than that, if it had not been cut off by the wind—and that her marks only showed 22½ feet, and that she grounded on the centre of her bottom in that 24 feet water. I think the tide-table gave 26 feet 4 inches. I do not know how much water there actually was, neither do I know how much exactly she drew. I have only resided in Liverpool two years, but then I have been continuously paying for this deficiency in the water.

Re-examined by Mr. Calvert.

There ought to have been 26 feet of water on the sill. I cannot tell you whether it was by reason of the position of the docks that the water had been removed by the wind. I only know the fact, that there was not so much water as the tide-table gave, and there was a wind at the time. The wind was north, I think; I cannot tell you exactly. I can tell you my experience in the matter. We are dealing continually in these large ships, and we cannot do business, as I explained before, satisfactorily in any others; and we are continually paying 100*l.* a week, perhaps, dock dues, in consequence

Losses from want of water and dock space.

of having those large ships. Last year, I think, our house exported to a port in the United States 58,000 tons, being an average of 1000 tons a week. The smallest ship we have, I think, is more than 1000 tons, and we go up as high as 2000 tons. Those vessels require a large draught of water; if we discharge them in the north docks, there is such competition that we are obliged to move them up somewhere else to load. If we dock them on the north shore, we are obliged to have two boats instead of one. With reference to the Star of Empire, she came to anchor. The dock master supposed there was water enough for her, and he gave us an order to dock. He supposed so from the tide-table. We consequently got a steam tug, and brought her down to the pier-head, where the wind had cut off the tide (as it does more at the north docks than anywhere else, I am told), and they ordered us off again. That was 10*l.* We were obliged to bring the ship, after an interval of nine or ten days, to the dock gates again, which is another 10*l.*; so that it cost 20*l.* to dock that ship, and we were obliged to protect ourselves from the consequences which would ensue from not being able to manage the ship by one boat, by having two. I have known as much as 45*l.* paid for docking a ship in some of the docks on the Lancashire side. It is an enormous expense, and continually occurring. We discharge vessels frequently in the north docks, and are obliged to bring them up to another dock. A vessel loading in the Waterloo Dock would have preference over a vessel loading anywhere else.

G. Warren, 19 April, 1858.

Cost of docking vessels.

By the Committee.—I have paid 45*l.* myself. We cannot always dock a vessel at one tide. A vessel coming in would go up into the Sloyne, perhaps, or off Birkenhead. There, I think, the best anchorage is; and then sometimes the vessel would be brought down, if she has to dock at the north end, at one tide, and then left and docked the next. I could give the name if necessary. The North America I know cost 33*l.* to dock there with only two attempts; that did not include the cost from loss of time to the parties, only the payment to tug-boat. The tug took hold of the North America in the river, after she was come up; after she passed the docks. There are others who can state better than I can why the north wind cuts off the tide more from the north docks than any other docks in the river. I have heard that remarked. I know that it is a matter which I feel, because we pay for it; but I cannot tell you how much exactly the north docks are affected more than the other docks. I am told that it is so. I do not know anything of the effect of the wind on the other side. There is a considerable want of dock accommodation at present, and particularly for the largest sized vessels. I have a vessel which had been here six weeks, and she had only had 1322 tons in her when she left. The size of the vessels coming to Liverpool has increased very much. We are very well pleased indeed, and entirely satisfied, with all the gentlemen connected with the docks, and the officers in charge of the docks, who attend to the details; they are very courteous in the discharge of their duty, and they give us all the accommodation which the means at their command will enable them

Courtesy of the Dock Committee and officers.

G. Warren, 19 April, 1855.

to do. The accommodation afforded to the trade of the United States is equal to the accommodation given to other portions of the trade. So far as our house is concerned, we have every reason to be satisfied with all the officials. In reference to the docks, I cannot tell the portion of the dock revenue which is paid by the United States trade. I believe that the scheme now before the Committee is disapproved of by the mercantile body of Liverpool. My acquaintance is circumscribed certainly in its character, but not in point of number. I find a general disposition not to go to the north end, if they can help it, with the vessels which come to the house of which I am a member. There is a general disposition to go into some of the more southern docks, if they can; the Waterloo Dock is a favourite dock, and they would rather go there. The discharging in the river involves a risk. The obligation of our bills of lading is to deliver the cargo at a place of safety. I have discharged in the river; the sister ship of this one was discharged in the river a year ago last winter, owing to there not being sufficient water for her to dock. She was discharged in the river and loaded in the river, but it cost 300*l.* more than if we had been in dock. It involves a great deal of extra expense to discharge in the river; there are the flatmen and all the other expenses. We do not escape the dock dues. If the dock dues were not payable it would be a question of pounds, shillings, and pence how far the abatement of the dock due would compensate for the expense and risk; I do not think it would. I do not know whether there is anything to prevent a foreigner established at Liverpool being a Trustee of the Dock Estate.

Cost of discharging and loading in the river.

Friday, 20*th April*, 1855.

THE RIGHT HONOURABLE HENRY LABOUCHERE IN THE CHAIR.

Captain Asa Eldridge, examined by Mr. Hardy.

A. Eldridge, 20 April, 1855.

I am a citizen of the United States, and have navigated ships between the United States and Liverpool for about ten years. I am at present captain of the King Lear; she is not one of those extreme clippers, but she is rather on the clipper model, and is of 2000 tons. When loaded she will draw about 24 feet. During the ten years I have come to Liverpool the ships have been gradually increasing in size; when I first came on the Liverpool line a 1000 tons ship was called large, but now she is not anything unless she is something like 1500, and from that to 2000; about a 2500 ship now is what a ship of 1000 tons was when I first came to Liverpool. I have gone to the north docks. If I might choose on the Liverpool side, I should go somewhere in the neighbourhood of the Waterloo Dock, where I went for a number of

Increase in size of ships.

years, but when I went there in the Red Jacket I went into the Sandon Basin, and docked at the Bramley Moore Dock. In coming to the port of Liverpool, as I have done for many years, I have not only formed a very valuable acquaintance with you English people on this side, but I have formed a very high opinion of the docks, and I must say that I have received more facility in Liverpool than in any other port of Great Britain, and I should think that even with its present docks Liverpool is about a century ahead of London. *Capt. Eldridge, 20 April, 1855.* Liverpool in advance of London.

In coming to Liverpool as a master of a ship, of course a man looks on both hands, starboard and port; and I must say, as we all know, when we enter past the Bell buoy, and come up through those channels in order to pass the Rock light and enter the river Mersey, when it is blowing fresh from the westward, we always are very glad to get past the Rock light, because it is much smoother, and we can handle our ships better in smooth water than where it is rough. If I am going to dock my ship, at present there is not any great facility on the Birkenhead side, consequently we dock on the Liverpool side; and in coming to Liverpool in the command of the ships Garrick and Roscius, for some eight or nine years I docked at the Waterloo Dock. Even the entrance of the Waterloo Dock is rather short for a ship of 1000 tons, because when you enter the basin you have to turn too much at right angles to turn with ease. It was intended more for smaller ships, probably, than a ship of 1000 tons. When you go into the Sandon Basin there is plenty of room, but there there is a great deal more swell. As you go to the northward there is more swell. Even when it is calm there is a motion, but in blowing weather there is a good deal of motion; and when you come to have a large ship of 2000 tons, with 3000 tons of goods in her, and she gets a motion, it is very hard to stop that ship, and it requires a very large fender to fender her off from the wall. We all know it is a great pressure, and the moment you put in the fender, many times it is smashed up as soon as you put it in, and after the fender has gone you come then to the ship itself, and if I had my money in a ship I should not want her chafed; because if a ship is well built in the first place, I do not believe you can ever make her any better than new. Another thing, a man does not want to go to the trouble of having carpenters and caulkers on board; if he knocks his channels off, the Dock Committee never think of putting them on at their expense; the ship has to do her own. The north docks, as a general thing with the wind from the westward, are on the lee shore; if we were going to sail a boat or a yacht, we know we are always glad when we get past a breakwater, or post, or light, or anything by which the water can be made smooth; so we are in a ship. If I were going to dock at the north docks, the wind blowing fresh, the holding ground is not very good; and then when a steamboat comes alongside there is a great deal more motion to the steamboat than there would be further up the Mersey, because the steamboat has to come alongside of you and take Swell in Sandon Basin.

Capt. Eldridge, 20 April, 1855.

you in, and the motion rubs and chafes your sides somewhat. Then also you require a pretty large hawser, and it takes a good many men to handle that rope, and it costs you more to dock the ship than in smooth water.

More docks required.

As regards the movement respecting these docks, I do think they require a good deal more accommodation in the port of Liverpool than they now have, because the ships have been increasing in size so rapidly. But the people of Liverpool, I think, have seen the importance of this, and I think they have a nice feeling towards all shipmasters and ships in a mercantile point of view. They wish to give us all the accommodation they can, and every facility possible, and I have been very well treated, and have met with very good despatch. But the south docks, even if there were not more docks, require revolutionising, and the enlarging of their entrances, and all that sort of thing, to correspond with the times. If they want more docks, why should any man insist upon putting them still further north? In looking at this thing as I do, as a private citizen, who has commanded a ship many years, and may for many years to come occasionally, let us look at this thing in a national point of view. Do not let any party feeling, do not let anything of that kind arise; because we have gone on the Birkenhead side, and laid out a good deal of money, and perhaps some of it very injudiciously, do not let us have any private individual feeling upon that point, when we are going into an enterprise like this, which is not only going to stand for years, but for a century to come, as the port of Liverpool. Let us build docks where nature has designed they should be, and that in my opinion is on the other side of the way. Whenever we go out of the docks at Liverpool, sometimes to take in passengers, sometimes to take in some freight, frequently having to haul out on account of the tides, where do we go? We go and anchor up in the Sloyne, near Birkenhead, because the water is smooth, and we can have flats, and all that sort of thing, alongside, much better than if we were further down. When we have come into the Mersey, on the Birkenhead side, we could let go our anchor very near the wall, and could dock with more ease, because we are heading the wind; we are on the side where the water is being blown off the land, and not blown on to the land. Then also we can have more water. Many of our ships in America we could load deeper than we do now if it were not for the want of water on the Liverpool side. I think there are 260 and odd days in the year that some of our ships cannot dock on the Liverpool side. That I consider a great detriment, and besides all that it incurs expense, and it incurs time, trouble, care, and anxiety on the part of the shipmaster, because I have been lying in the river myself waiting to dock; I have been down morning after morning and looked to see if my bowsprit was standing; I have been lying with my anchor dragging, and two or three steamers hold of her. When in the Red Jacket I had three steamers hold of me for two or three hours, and they claimed salvage, because they said they saved

Shelter and deeper water on the Cheshire shore.

my ship, and if I had not stood the rack pretty well I suppose they would have got salvage. It cost me 100*l.* If I could have docked I would have gone in and saved that. I would have saved my channels, which got knocked off on one side. All those things are very perplexing indeed. *Capt. Eldridge, 20 April, 1855.*

I have no feeling for either side, only as I was asked by some gentlemen to come here—though I am very busy and going to the United States on Saturday—I come to give my opinion as to what I think is true; I have no feeling for either side, one way or the other; but if I could come to the port of Liverpool, and both sides were equal as regards trade and that sort of thing, I should say, let me dock my ship on the Birkenhead side, and I think it is the opinion of almost all our American shipmasters, who have for a great many years looked forward to the time when those docks will be finished. We have talked it over time and time again, and at the time that Collins's boats first were built, it was first talked over in the United States, and we all of us came to the conclusion that we wished the docks on the Birkenhead side were finished. I do certainly wish they would come in and consolidate the thing rather than go further north. Consolidation of both sides.

Cross-examined by Mr. Merewether. *Cross-examination.*

They need more docks in Liverpool than they have now. I approve of that portion of the scheme by which it is intended to enlarge the entrances to particular docks at the south end; if I were going to alter the docks, I should alter the entrances and the locks. The Mersey is a very good river, but the tide runs very strong, and we all know it is a very stormy river. It is a good river, but with the wind blowing from the westward, and the strong tide there, it generally puts us to more or less trouble. It will be worse in my opinion if you build docks further to the northward, because the water strikes against the north wall and strikes the other side and washes the sand out and tends to fill up the river, and in my opinion the tide will run stronger there than it does now. I should let the north docks alone, and build them on the other side. Birkenhead at present would answer my purpose very well if it would answer the merchants' purpose. If I come to the port of Liverpool, and both sides were equal, I should go on that side, but if my ship has got to work to her detriment, I should then go to the other place; if I had to pay more for it, of course I should dock at Liverpool, because I work for money. When we lay our ship on for freight, we lay her on for the port of Liverpool; we come to Liverpool, and I believe at present on the Liverpool side it is considered to be the port of Liverpool. I do not know that any of our ships with cotton freights, or any general merchandise, have ever docked on the other side. I believe that all our Americans would dock there provided they were equal. Provided the merchants would take my cargo if I went to the Impact of tide on wall of north docks.

Capt. Eldridge, 20 April, 1855.

Birkenhead side, I should rather go there and deliver it. Whether the merchants feel disposed to take it there, or whether there are any disadvantages connected with it in that respect, is better known to the merchants than to any shipmaster. If the docks were consolidated and it were all Liverpool, some of them would, I suppose, try to move over a little bit. I would not dock on the Birkenhead side, if I could make more money docking on the Liverpool side. I think the merchants of Liverpool have tried to do all they can to help the shipping interest hitherto, and to accommodate us; and they still feel disposed to do so. I think the Liverpool merchants, as a general thing, try to keep up with the advancement of the trade, and wish to do so. I think the charges reasonable.

J. W. Green, 20 April, 1855.

John Wilson Green, examined by Mr. Hardy.

I have been engaged as a shipbuilder at Liverpool for thirty-five years. My attention has been turned to the question of dock accommodation at Liverpool during the time I have been there, and it has been part of my duty to attend on the piers of some of those docks towards the north at the time when vessels were coming in. At the Sandon Basin, I have seen large vessels frequently coming in there when I have been upon the pier. It is easy for large vessels to dock there, from the circumstance of the width of the entrance. The entrance is wide, otherwise it is dangerous in bad weather. I have seen the Atlantic, the North American mail steam ship, in very great jeopardy and peril there, and notwithstanding the assistance of five tugs they could not dock the ship; she was blown on to the wall, and remained fixed there for some time; the ship was in very great danger; the wind was north-west; there is a very great swell on that side. The Constellation was in some difficulty there; that was in the inner docks, quite inside. There is a very great ground swell, as it is technically termed, in the inner part of the docks; the large ships seem to feel more the commotion of the water than the small ships. I have seen another ship in there when there were large timbers two feet thick put on the sides of ship, and they were smashed to pieces in about five minutes; the Blue Jacket, that was in the Wellington Dock; the other was in the half-tide Sandon Dock; there is a great motion there; it is not fit for a ship to lie there in the winter season. I have been frequently called to the north docks by occasions of that sort. I have been brought out there on Sunday to secure ships, by having fenders made to protect them from blows against the wall. On the occasion of the Sunday to which I allude, we cut ship masts up to make fenders to save the ships. In the interior of the docks—I see the harbour master here—at the time when the Atlantic struck the pier and got upon the wall with her paddle-boxes, I am confident, from the expression he used to me, he thought the ship would be destroyed; but it so happened that the following sea to that which took her there took her away, otherwise the ship must

Difficulties at Sandon Basin.

have been destroyed. That part extends in such a manner as to be unprotected by the western shore of the Mersey; that which we see there is the eastern shore, and a north-west wind has a direct course from the Atlantic Ocean directly upon the face of those docks upon that shore. Having regard to these facts, I do not think it a wise proceeding to extend docks further in that direction; they cannot be worked in bad weather. I see gateways formed there; now those gates must either be kept shut or open in bad weather; if they are shut they cannot open them, and if they are open they cannot shut them. That is on account of the sea. At the Clarence, which is about half way, those gates in bad weather, if they are open, must remain open till nearly low water; even there there is considerable sea. By bad weather, I mean that sort of weather which prevails a great many days in a year. My observation does not apply to the whole line of docks; as the sea rolls up the river so it subsides. Up to the Clarence Dock the entrances are exposed, but beyond that the river is shut in, as it were, by the western bank. The docks ought not to have been carried, I think, so far north as the Clarence Dock; they cannot by any engineering skill have deeper water in any of the docks beyond; all the northern part of the town should have stopped there. This part silts up both on the ebb and on the flood. They cannot have deeper water below. That is the deepest part on the Liverpool side; there is no dock in Liverpool which has deeper water at the entrance than the Waterloo Dock. That is 6½ feet above the datum; there may be sometimes 26 feet of water there. Taking two ships drawing the same water exactly, a ship can dock there with considerably less water than to the north. The silt would be a constant expense towards the north. It is a constant expense now; they are constantly dredging in the present docks. The Sandon Basin is being fast filled up. They ought not to go further north; there will be an immense destruction of property by going there; there is no advantage in it; you have less water there and a heavy sea to contend with. They dredge all the docks, but those to the north are more frequently dredged than the others. Assuming that deeper water could be had on the other side of the Mersey, it would, in my opinion, be advisable to seek for docks there. As regards the advantage of docking ships, there would be less danger and risk to ships, and I think they could be docked there at any period of the year, and at all tides. I think there are various disadvantages in going north; new roads cannot be made there for carts and waggons; the present roads are far too narrow and too small. You have carts sometimes stopping half an hour or an hour together, and cannot move, and there is no ground to make other roads and approaches to those proposed new docks. There is more traffic upon the present road than it is capable of containing; there can be no approaches to these docks on the land. I question whether there are any means of making approaches. It would cost as much money as to make the docks. If the money which would be laid out there were laid out

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Exposure of docks north of the Clarence.

Objections to docks at the north.

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more in the middle of the town, or at the southern part of the town, I think it would be well laid out. If the timber trade were removed to the north, the carrying of timber up the river in flats would be prejudicial to the navigation of the Mersey, and a very great risk—a risk to ships and steamers as well as to the flats conveying the timber up; they would have to cross the river, as it were, twice. I am assuming that they are coming out of these new docks, or out of the Sandon Dock. Ships going to those docks frequently get up their anchors two hours before high water—that would be quite as early as the gates could be opened—and those ships may be driving up, with their anchors on the ground, in charge of a steam tug; very often a ship will miss the dock for the purpose of keeping clear of those floats, and it might occasionally lose the tide. The moment they came out of one of those entrances the tide would sweep them away; they would have to get across the river to the western side as soon as they could; any one who sees the Mersey in the winter time must know that the towing of flats is very dangerous. If there were a swell with a west wind, the flats would not be able to go up safely. Loaded with timber, the sea would make a breach over them. I should say that about 70 per cent. of the timber does go up the river. The flats are towed in long lines one behind another. Those long lines of flats can scarcely be towed in a continuous line when they have to cross the tide. There is no part of the north of Liverpool well suited for ship-yards; we had a yard towards the centre of the docks, and I have seen the sea roll 300 yards and upwards up that yard. Ship-building would be considerable at Liverpool, but there is no accommodation for ship-building on a large scale. With suitable accommodation there would be more ship-building than in any part of England, more than in the Clyde, in fact; wages would subside in some degree, in consequence of the number of people that would be brought there; wages are now so high in consequence of the monopoly which prevails. The amount of the wages in Liverpool arises from the monopoly of the men. Birkenhead would afford facilities for ship-building far greater than Liverpool. I consider it very important to have deep water entrances, and especially to have smooth water. That would be the case at Birkenhead; there is comparatively no sea there.

Inconvenience of timber floats.

Cross-examination.

Cross-examined by Mr. Hope Scott.

There are no facilities at Birkenhead for ship-building; if the proprietors of the land at Birkenhead had made ship-building yards and repairing docks, there would not be less than 20,000 to 30,000 artisans working there now. That is the fault of the proprietors and the gentlemen who commenced building there; they spent all their money without making useful works. We have not had all those opportunities because the land at Birkenhead was bought up, and instead of converting a portion of the land into repairing docks, they made a long useless dock

there, and though they had thousands of acres of land they would not let any be apportioned to ship-building. That was very bad management. If it had not been mismanaged, there would have been a large business already in ship-building, and a large business of other kinds, such as foundries, &c.; ship-building brings almost everything else. Birkenhead is particularly adapted for ship-building; timber can be landed with more facility there than at Liverpool; there is an excess of charge at Liverpool; every piece of English oak brought down the river has to pay fourpence extra for being landed. The float at Birkenhead has, I imagine, an equal depth of water with any of the Liverpool Docks, but the gates are too narrow; you could not get a large ship in. You could not get in a ship of more than forty feet beam. There is a great deal of timber taken into the float there and discharged. That forty feet beam would cover the average of the Baltic trade, but not the North American. Very little American timber goes into the Birkenhead Docks now compared with Liverpool; I cannot tell you the quantity. North American timber is not discharged in the stream; it is very seldom that ships discharge in the stream, because the Mersey is rather rapid. Small vessels in the North American trade go to Birkenhead; I have never seen a large American ship in the timber trade in those docks. Supposing Liverpool to progress as it has hitherto, and supposing ship-building to go on there, nearly the whole of the Birkenhead space would be required. There are so many ships frequently lying in the docks at Liverpool waiting for berths, that they would almost occupy the whole of the Birkenhead Docks. I think if all the ships that were waiting to discharge or to load could each have quay berths, it would occupy the Birkenhead space too, except the great float. There is land enough, exclusive of the dock space, for ship-building to be carried on extensively at Birkenhead. There is land at Birkenhead round that float which might be appropriated to ship-building and repairing, still leaving all the water shown upon their plans for docks. It is almost too much to say what Liverpool might require; there are miles of land there which might be appropriated to ship-building, or similar purposes, without interfering with the water-space. In my judgment, Birkenhead Pool presents greater facilities for ship-building than any other part of the port of Liverpool. Wherever ship-building is carried on extensively, it is a most profitable business to any town or neighbourhood; it employs all trades. It gathers round it an immense business of all kinds—smelting and all kinds of operations in iron; as well as artisans of every possible description. I should give a decided preference to the ship-building trade on the Birkenhead side, and for this reason: a large ship can be launched with perfect safety at Birkenhead, but at Liverpool a large ship cannot be launched with perfect safety, because there is a great doubt of getting that ship into dock. I have lived in Liverpool a long time, and have frequently protested against the gradual spread of the docks to the north—that it was an

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Birkenhead well suited for ship-building.

North docks should not have been made.

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error; dock accommodation at the north ought to have ceased fifteen years ago, I think; after which everything became an error, because it was exposed to an open roadstead. That has, I think, been the general feeling in Liverpool. The Dock Committee rule just as they please at Liverpool, and I regret to say I do not agree with my friend the American captain; they do not consult the public as they should do, nor give the facility they should. If the Dock Committee had consulted the interests of Liverpool, instead of forming north docks they would have gone back, and an immense portion of land might have been purchased; property within the last fifteen years has increased more than 100 per cent.

Objection to Dock Committee.

The Dock Committee is constituted partly of the Council, and partly of shipowners. The burgesses elect the members of the Council in Liverpool; the ratepayers appoint the shipping portion of the Dock Committee; a certain portion are re-elected once a year. I do not think they appropriate the land to the best purpose. My ship-building yard was taken away for the dock. The effect, upon the Liverpool side, of a north-west wind, reaches as far as the Clarence half-tide dock; it somewhat subsides as it passes there; it is just as bad as the Salisbury Dock. After the sea impinges upon the bend there, it subsides. The north-west wind is the prevailing wind at Liverpool, north-west and west. We have not so much southerly and south-west wind. There are numerous accidents; I have mentioned those which I was a witness to. I do not call a ship being damaged to the extent of 200*l.* or 300*l.* in a place of safety. If I had been aware of coming here, so that I might have acquainted myself with the circumstances, I could have told you. The Atlantic, the Blue Jacket, and the Constellation, were not all in one year. The Atlantic and the Constellation were about the same year; the Blue Jacket was last October. I have known cases in which they put cotton bags between ships to save their tearing their sides to pieces; the harbour master knows it. All ships carry fenders; I am speaking now of putting down bags of cotton or any substance which could be got hold of to save the sides from being torn to pieces. Accidents happen up in the south part of the river, but they do not happen there from stress of weather so much as to the north; the weather is not so severe up the river. Fenders are used upon the Birkenhead side also. No accidents happen there; it is a

Birkenhead a sheltered shore.

sheltered shore altogether; it is on what may be termed the land side of the wind. I am not aware that there have been accidents upon the Birkenhead side; I have never repaired a ship which had suffered accident there. I know the Pluckington Bank; it has no effect upon the shelter of the Mersey. That bank is up the river; it is to the south, in the upper part of the river, and interferes a good deal with the access to the south docks. That effect has been found in the timber trade, particularly in the upper part of the river; there is a danger of large ships grounding upon it. The bank outside the Mersey has no effect as a shelter against the tide or the wind when it is submerged, when the water is over it; it is a shelter till the water is over it, but not afterwards.

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Re-examined by Mr. Hardy.

Whatever docks vessels go into they use the ordinary fenders. I was speaking of fenders, on extraordinary occasions, to save the ships' sides. A ship grounded at the gates last Monday, at Liverpool, opposite what is called the Wellington Gate. I cannot tell from what cause that was. I do not know what water the ship drew; in my opinion no large ships ought to dock there with less than two or three feet of water under them, because of the sand held in suspension in the water. I have no doubt, if a ship drew 20 feet water, and there were 24 feet on the sill, the ship might touch there; I was not there, and do not know much about it. There are accidents to ships every gale of wind inside the docks, in the present north docks; that is from the swell coming in through the entrances, such as they are. I know that, from my business as a ship-builder; they can have the same depth of water at Birkenhead as at the south docks at Liverpool. At present it is a foot and a half less, it is a temporary entrance; a large ship could not get in there; not what I term a large ship. The ship-building yards at Birkenhead would occupy the land without encroaching at all upon that which is allotted to the water in the docks. In the neighbourhood of the float there is agricultural land to the extent of 4000 or 5000 acres, all of which would be available, of course, for any business connected with the docks. The Corporation of Liverpool are making ship-building yards, on the Birkenhead side, between Tranmere Ferry and Woodside. That is upon Corporation land; they have a good deal of land there in reversion.

Constitution of Dock Committee.

By the Committee.—I cannot suggest any mode by which the public interests could be better protected than they now are, by any different composition of the body managing the docks; they have made errors in judgment. I do not think the Dock Committee has been quite aware of what the dock surveyor has been doing. I think he has been concocting docks without the knowledge of the Dock Committee; that implies mismanagement. We seldom know anything about their proceedings till the docks are thrown open, because the public are kept from the works. It is a very extraordinary circumstance, that although these evils exist, some members of the Dock Committee do not know the circumstances which attend the formation of the docks there. I have spoken to members of the Dock Committee, and they do not know the circumstances which exist. I cannot suggest any means of constituting the Dock Committee which would render them less liable to error than they are now, unless they were a body of men totally apart from Liverpool altogether; but you cannot constitute them better if you select men from Liverpool. My opinion is that the docks have been formed without consideration—for instance, with regard to graving docks; the judgment of men whose business it is to repair ships in those docks has never been consulted, and thousands and thousands of pounds have been thrown away upon the graving

Ignorance of proceedings of Dock Committee.

J. W. Green, 20 April, 1855.

docks, and I have no doubt when the new works are made it will be no better. I have no doubt, so far as a practical man goes, the engineer is a capable man, but I think in the system of docks there does not appear to be much judgment; and it has always been considered, if the Duke's Dock could be removed, so as to allow an open communication from dock to dock, it would be a great facility. With this fact before their eyes, they have commenced here making new docks; and a ship to go from one dock to another must come out into the river, because there are no two of the gates alike. A wise engineer would have made all those gates of one width and one depth. I believe the opinion which I have expressed with regard to the errors which have been committed, to be a common opinion. I have frequently expressed it. I have mentioned the circumstance frequently to members of the Dock Committee, and they have been quite astonished at what I have told them as to some of the docks. The dock ratepayers to whom I have spoken entertain the same opinion; they have been astonished at what I have told them. The only occasion on which I have known any notice taken was when the last six repairing docks were made—they were pronounced to be the most perfect docks in the world, but when they were opened we could not use them. The remedy, if there be errors, is in the hands of those whom it most concerns. It is most extraordinary they do not remedy what is wrong. The proceedings of the Dock Committee are reported in the newspapers, as to the public part, but we do not hear anything about any arrangements of the docks till they are finished. I think competition would be a benefit to Liverpool. I should much regret to see the Birkenhead and Liverpool Docks under one body, even though a public body. I would rather there was an opposition at Birkenhead, because it would improve the facilities at Liverpool to a very great extent. There would be a sort of competition, which, even directed against a public body, who are supposed to act for the public alone, would be an advantageous stimulus. There would be advantages in both sides of the river being all managed under one system, if the parties would work for the sole benefit of the public in the management of the docks; but if they do not do so, then I think an opposition is useful. I admit, looking at the present commerce of Liverpool, that merchants and shipowners do require increased accommodation. I object to that dock accommodation being given further north, only in consequence of the dangerous state of the river at that part. I would go south, or on the Birkenhead side. I do not think a Liverpool merchant would like to take his ship into the new northern docks. We must go south, there is convenience and every facility; there is a place beyond the Brunswick Dock as deep as any part of the river, as near to the centre of Liverpool as the north part; the Pluckington Bank would not be in the way; the Pluckington Bank is only in the way of those docks in immediate contiguity to it. Knots Hole is the deep part to which I refer; it is as deep as any part, and as good a part for docks. I think

Amalgamation of Birkenhead and Liverpool inexpedient.

merchants would rather have ships in the Birkenhead Docks, than lying in the river in bad weather. I do not think there is any such objection in regard to the market as would prevent vessels using the Birkenhead Docks if they were made. For some years there would be a leaning towards Liverpool, because at present it is the seat of the traffic; but the railways seem to have the effect of bringing Birkenhead as near to London or Birmingham as Liverpool is. It is rather the effect of the habit of the trade, which would change in time, than any essential impossibility of the market of Liverpool being made use of by ships docking at Birkenhead. A vast quantity of goods are brought by water to Liverpool, and it would be just the same expense, or rather less expense, to take them to Birkenhead, than to take them into the Liverpool Docks. The docks made on the Birkenhead side of the river would be an addition to the dock accommodation of Liverpool, and would be used as such. Rivalry between the two sides, or the whole being under one management, would have no effect if the Dock Committee of Liverpool would grant long leases to ship-builders. At Liverpool they only give us six months at a time, so that we cannot carry on any businesss of any consequence there. It would not affect the ship-building if the Dock Committee, or the persons to whomsoever it belonged, would give long leases; then I would as soon take premises from the Dock Committee as from any one else, but my impression is that they would not do so. I imagine that there is sufficient ground now for the timber trade; I think a vast quantity of the timber trade would go to Birkenhead if they had space, because it could be taken with more facility up the river than from Liverpool. There is more land at the north part of Liverpool; but it would be a great obstruction to the river to have flats moving up the river every tide. I think, though it is a very uneven ground, there is sufficient ground at the south for the timber trade there. I fancy there is as much ground now at the south part of Liverpool unoccupied by anything, as is occupied by timber. I do not think this scheme can affect the timber trade, simply as a timber trade. If a man imports a cargo of timber, he can sell it as well at the north end as at the south end; and I do not know that it affects him much. I am speaking of the dealers in timber, and I do not think that it is of much importance to them where the timber is landed. I do not think this scheme can affect the shipowner, except as to the difficulty and danger of getting their ships into dock; they may be favourable to the timber trade being to the north, but they cannot be favourable to the ships docking there. I should very much doubt if the importers of timber at Liverpool have expressed favourable opinions to this scheme. I have reason to know that persons have said they would rather remain at the south end than go to the north. I am not aware whether they have protested against it; I know that there have been expressions against it; I know that men have been sent into the Dock Committee purposely to oppose the scheme of

J. W. Green, 20 April, 1855.

Change in habits of trade.

Long leases for ship-builders.

J. W. Green, 20 April, 1855.

going to the north; I do not know that they have opposed it when they got there. I think Mr. Steele is an instance of being elected to the Dock Committee, with the sole object of opposing going to the north end. I do not know what he did when he got there. I am aware that the Council can negative the proceedings of the Dock Committee. I am not aware that the plans were submitted to the Council.

W. Barber, 20 April, 1855.

William Barber, examined by Mr. Calvert.

I must express, being one of the trustees for the Dock Estate, my reluctance to come here to give evidence, but a gentleman called upon me, and told me that a Speaker's order had been applied for, and that it would be for the convenience of the Committee that I should attend to-day rather than come at some future period; that being so, for the convenience of the Committee I have attended, but I should prefer having that order served upon me. I am a member of the Dock Committee, and a nominee on the part of the American Chamber of Commerce.

Individual trades to be represented in the Dock Committee.

At the time of the alteration of the Dock Trust there was a compact entered into that there should be representatives in the trust of the individual commercial interests, but it has been since broken; representatives of the interests of those trades. I think the American Chamber have three. The American trade, the preponderating trade, pays, I believe, one-half, or nearly so, of the whole of the dues of Liverpool. It pays 148,000*l.* out of 312,000*l.*; that is, the trade of the United States alone. I pay particular attention to the subjects connected with the American trade in the business which I transact in the Dock Trust. It is thirty years since I began to act as a merchant at Liverpool. I am decidedly opposed to the present scheme, and I have always expressed my strong opposition to it. The principal reasons that I have are in a financial point of view. As a faithful representative of the interests of

Objections to proposed scheme.

that estate, I think it is very inexpedient to go to such an outlay as is proposed, first, in the purchase of land. That land cannot be made available for a number of years, and I do not think that the situation of the estate, financially speaking, is such as to warrant it. I look upon it that there would be nearly a million of money laid out in the purchase of land, and at the present rate of borrowing money that would entail an annual charge of 45,000*l.* to 50,000*l.*; and we have no surplus, I think, to warrant that at all. That is one ground of my opposition to it. On the details of the plan it is understood in the Dock Committee that the opinion of the Dock Committee has not been asked nor expressed. It is supposed that they are subject to revision. There are a certain number of bonds, which it will be necessary to meet by payment in the course of the next two or three years, of a very large amount. To meet those we must borrow money from other persons, in order to pay off the existing bondholders if they ask for their money. That is a financial operation which renders it very expedient to be careful in reference to

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the increase of the bond debt. If the present scheme is sanctioned, the general credit of the trust will suffer in the market. Its being further involved in a large amount of debt must affect its credit in the market, no doubt. If they are now borrowing money at 4¾ per cent., they must give a higher rate of interest for the money that they will borrow in future years. It appears from the published statement that the amount repayable in 1855 is 1,284,426*l.*; in 1856, 1,256,985*l.* The unpaid bonds for 1854, according to this calculation, are somewhere about 600,000*l.* Considering that those sums must be paid off in case the bondholders ask for their money, I think it is very inexpedient to spend money which will not be immediately productive, to provide an income out of which to pay the interest upon that money proposed to be borrowed. We are supposed to have had, according to the results of 1854, a surplus of about 60,000*l.*; but I look upon that as quite delusive; the trade will not warrant it, and we are increasing our expenditure by an additional charge in the shape of interest. The results of 1854, as regards the trade, are quite illusive, and there is no reason to suppose that the trade will in future support that surplus of 1854, which is continuing to be spent in improvements. The Dock Committee have adopted the report of the sub-committee, but it was understood and stated by the chairman that those plans were not plans that the Dock Committee were bound to carry out; that they were subject to revision at all times. The matter which was decided by the Dock Committee was simply the principle upon which they were going, whether it was expedient to go to Parliament, or to pass those plans with the object of going to Parliament to borrow money, to enable them to extend the docks to the north; and whether it was according to that plan or according to some other plan was for after consideration.

Injury to credit of the trust.

I have a very strong opinion with regard to the appropriation of the dock space that we have already; I believe it is not made anything like as available as it might be. I have expressed that opinion frequently to the Dock Committee. I know I am in the minority. There are two docks here (pointing to the map) which comprise but a moderate space of frontage. Those two docks produce a revenue, according to our returns, of 37,000*l.* This one, with half of this quay space, and the entire of those two, with all that large space, only produce 12,000*l.*, or one-third that proportion. This dock (pointing to the map) produces little or nothing. I believe it will not produce us more than 1½ per cent., whereas these two will produce us 12 per cent. This dock is frequently empty. I should wish to have a more equal distribution of work throughout the different docks, and a more equal apportionment of the accommodation in the different docks, to make the estate which we have more useful before we purchase any further estate. I am a very great advocate for concentrating the docks, and a great opponent to the necessity of having to traverse the lines of streets with carts laden with merchandise, to the great detriment of the town in every respect. It

Better appropriation of existing dock space.

Concentration and saving of cartage.

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involves a great cost to the town in the renewal of the pavements, and is an unnecessary expense to the commerce of the country in the charges for carting and recarting. I would render as available as possible, by every means of modern invention, all the dock ground which lies in the centre of the Liverpool system. I attended a meeting of the Dock Committee on the 3rd of August, 1854, which was adjourned to the 24th, when I moved, and Mr. Healing seconded, the following amendment to the plans then proposed:—"That the plans be referred back to the special sub-committee, with a view to confine the extension of the docks to the land already in possession of the Committee, and that they report again upon it, together with such improvements in the existing docks as they might deem advisable, and as the estate was capable of." It was negatived by 17 to 3. Mr. Evans then moved, and I seconded, a further amendment, to the effect, "That the further consideration of the plan should be referred back, with instructions to take the old plan of 1848 as the general basis respecting the proposed canal dock, and limiting the immediate works to the north to about 28 acres, and the graving docks, and the docks on the land east of the Huskisson Dock, and then proceed with the formation of the Huskisson Dock." That amendment was negatived by the same majority as the previous one. I believe I went into this subject of the unequal produce of the different docks upon that day; but I must premise by saying, that when the plans were produced by the sub-committee to the Dock Committee, one gentleman of that Committee proposed their adoption, and another seconded it. They gave us no reasons, nor stated any grounds upon which they had come to the conclusion which they had done, and it took myself and others, no doubt, by surprise; and I felt that it was not what I should have expected, to have brought those plans to us without anything being said as to what they were grounded upon, and I had to open the inquiry, or the observations, myself, and then, I believe, it led to some remarks in reply to mine. Some members, one gentleman in particular, who is not now a member of the Committee, had expressed himself as opposed to the plans upon their first being presented, but he afterwards advocated them at the adjourned meeting. I informed the Committee that the Waterloo Dock, for the year ending the 24th of June, 1854, worked as much as 30,000 tons per acre, according to the return given to me at my request; and I believe it is borne out by the subsequent return, made according to the usage of the estate. Also the King's Dock worked only 7100 tons per acre, and the Queen's Dock 10,100 tons per acre; but I do not think these quantities are quite borne out by the returns of the annual statement that we receive at the Dock Committee; they vary a little. As regards the return of the dock which is put down at 7100 tons, I do not find any dock in the annual return which produces a less average than 10,000 tons. The King's Dock and the Queen's Dock may be taken at 10,000 tons per acre, and the Waterloo Dock at

Motions for further consideration of plans.

Work at different docks.

30,000 tons per acre. That was produced to the Committee to show, that if the King's and Queen's Docks were worked as well as the Waterloo Dock, they would accommodate a much larger amount of traffic than is now accommodated in those docks. A further meeting of the Dock Committee was held on the 1st March, 1855, when Mr. Evans proposed, and I seconded, the following motion:—"That so much of the resolution of the Committee of the 24th of August last as confirmed the additional purchase of land made by the Special Committee from the Earl of Derby and Mr. J. S. Lee, and the authorised purchase of land under the usual compulsory powers, still further to the eastward, from various parties, be now rescinded, with the view of confining the works proposed by the Bill within the existing limits of the Dock Estate." It was negatived. The expression of the opinion of the Dock Committee at that time was merely as to whether we were bound to carry out our engagement with Lord Derby and John Shaw Lee for the purchase of this land. It was no expression of opinion as to the merits of the scheme; but some members of the Court who had not had an opportunity of giving their opinion upon the previous occasion voted against that rescinding, on the ground that we were bound in honour to complete our engagement. The members voting in the two cases were different; on one occasion they voted on the merit of the scheme, upon the other on the question of good faith. They were not the same individuals; gentlemen who had retired were replaced by others; one gentleman had resigned and others had been changed. The Dock Committee, in March, 1855, were informed that a great legal authority had advised the Committee that they were bound to carry out the agreement with Lord Derby. I must say, also, that I should have been of the same opinion myself, had it not been for my particular protest at the time, when the sub-committee brought their report to us, as to their having made a bargain with any one without our sanction or approval, or without our extending the powers which were given to them originally. It is a bargain conditional upon their getting the sanction of the Town Council of Liverpool and the sanction of Parliament. I considered that the Committee had exceeded their powers in making any bargain, conditional or otherwise, and I thought it right to protest against it. I thought that they should have made no bargain except with the sanction of the whole of the Dock Committee; the bargain was made by a sub-committee. I called for the resolution appointing that sub-committee to be read. They were appointed for the purpose of producing plans for the improvement (the word "improvement" being introduced by my own suggestion) and the extension of the Dock Estate. The words are, "subject to the approval of the General Committee of the Town Council, within a limited period, and to Parliamentary powers being obtained for carrying the same into effect." The sub-committee who so negotiated upon that subject had given an assurance to Lord Derby that they would do their best to have that agreement carried into effect.

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Contracts for land.

Powers given to sub-committee.

W. Barber, 30 April, 1855.

In giving that assurance, I thought they had exceeded the authority which had been delegated to them by the General Dock Committee.

Disregard of capabilities of Cheshire shore

The Dock Trustees, in considering what scheme shall be adopted at the present time, have wholly disregarded the capabilities of the Cheshire shore, so far as the proceedings of the Committee have indicated their design. There is no evidence that the Dock Committee have taken into consideration any advantage to be attained on the Cheshire shore. The Dock Committee, and the gentlemen who have advocated the plan, make no secret that they have considered the benefit which would accrue to Liverpool from the work being done at Liverpool, rather than on the other side of the river; that is generally expressed by them. A great many builders and carpenters would be employed at Liverpool rather than Birkenhead. One gentleman, who is a great projector of the scheme, strongly advocates that, as one circumstance which ought to be at all times taken into the consideration of the Dock Committee in the arrangement of its general trust, the advantages to the tradesmen or artisans of the town of Liverpool. The works are paid for out of the dock rates, not by the people of Liverpool, but by traders from the whole world. I believe that no cheaper or better works could have been made, than have been made, as far as construction goes. They were done and they are done as cheaply as they can be done. There has been nothing of what is called jobbing that I ever witnessed or supposed. The expenditure upon the purchase of land is a matter I cannot give any opinion about; the portion of the cost which would arise from the purchase of land I have no opinion about. I am alluding to works constructed under the management of the surveyor, of whose capabilities I have a very high opinion, and I believe he does them with every economy, and does them very well. If the proposed expenditure of four millions were an extravagant outlay, the benefit of that will go to the artisans of Liverpool, and the payment of it will come from the merchants of England. The trade of Liverpool is a transit trade, it is a port of transit rather than a port of consumption. London is a port of consumption and Liverpool a port of transit. The consumer is the person who pays the dock rates eventually; the dock rates are the fund out of which these works are to be paid for; therefore, if the cost is extravagant it must be paid by the consumer; that being the case, the people of Liverpool are not the persons likely to complain about them; they have anything but that inducement. If, by an outlay of one and three-quarter million of money, the Birkenhead Docks, with 200 acres of water and 200 acres of land and quay space, could be brought into active operation, I should think an outlay of that nature more expedient than the outlay of four millions now before the Committee. Supposing those works to be completed, Birkenhead would then be an effective and available port. I see no difficulty at all in the cotton import taking place at Birkenhead. I think the cotton trade could be managed or

Based wholly on regard to Liverpool interests.

Works economically constructed.

Outlay borne by the general trade.

Birkenhead convenient for cotton trade.

stored as conveniently and as well in Birkenhead as in Liverpool, and there can be no objection on the part of the trade to it that I am aware of. The cotton importer has little to do with the safety of the ship; it would depend simply upon the conveniences to the trade where the cotton was stored. Supposing the whole of the cotton were stored in Birkenhead, I see no difficulty in the cotton trade being carried on as well as it is now; they could do the work as conveniently and expeditiously, if they could have the same access from Birkenhead to the interior. I express no opinion upon the position of Birkenhead; I am not particularly acquainted with its appliances as they now stand. I should prefer any opinion of mine upon the relative positions of the two places being withheld. The trade of the United States is nearly one half of the whole trade of Liverpool, and the cotton trade I should say is certainly half of that; these dues I allude to, comprise the dues payable upon outward cargoes, exports from Great Britain to the United States, as well as the imports, and the dues upon the tonnage which bring the imports. I am quite within the mark in supposing the cotton trade to be equal to a fourth of the whole.

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Trade of the United States one half.

Cross-examined by Mr. Merewether.

Cross-examination.

I am opposed to paying the price they are about to do for this land, and keep it for so long a period unavailable, and almost double the cost of it, which would then make it an extravagant purchase, even for the price of land more in the centre of the town. I have taken into consideration the question whether we shall get the land cheaper now than ten years hence, and I consider that we should not get it cheaper now than ten years hence. In that calculation I do not speak of the positive price to be paid on the day of the purchase, but I take into consideration the amount of the interest that would accrue during the time that we were making no use of that land. The docks which I pointed out to the Committee as earning 12,000*l.* against 37,000*l.*, are the Clarence and Trafalgar against the Waterloo and Victoria. I am aware that they are appropriated to the coasting steam trade, which does not pay dues on goods; I never agreed with the expediency of that appropriation. As to the Queen's Dock and the King's Dock, I know it is part of the scheme to deepen and to widen those docks for the admission of larger ships; they will not at present admit large ships. One ship of 1000 tons will take up less room than two ships of 500 tons. When the access of larger ships is made possible, there will be a greater means of utilizing those docks than there is at present in that respect. I know of no scheme excepting this which has ever been presented to me by the Dock Committee. I am asked to point out an occasion on which I was not at variance with the other members of the Committee; I have never been at variance with them except upon this scheme.

Cost of land.

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Re-examined by Mr. Calvert.

I compared the King's and Queen's Docks with the Waterloo Dock; the deepening the King's and the Queen's Docks is one of those omissions which I think ought to be corrected; that is one of the great elements upon which I base my calculations of the improvement and expansion of the central and already completed docks. Steam had nothing to do with the King's and Queen's Docks. The Trafalgar is only partly a coasting dock, it is appropriated to steam vessels. Those which are not coasters pay dues.

Representation of United States interest.

By the Committee.—I believe I am the nominee in the Dock Committee of the American Chamber of Commerce, under a compact and agreement at the time the alteration of the Dock Committee took place; at the election of the members to that Committee I was absent in Scotland. There are two other members of the Dock Committee standing in the same position, as representing the American Chamber of Commerce; one is Mr. Evans, who goes entirely with me; and the other Mr. Malcolmson, who from ill health has not been able to attend, or express any opinion for more than eighteen months, so that his opinion is quite lost upon the subject. I may further say, that the American Chamber of Commerce have expressed no opinion of their own upon the merits of this scheme; but as it is quite notorious that both their nominees have strenuously opposed it, we take for granted they quite agree with us. I conceived, from communication with them, that I was representing the American Chamber of Commerce in the course I have taken in respect to the accommodation which is already afforded to the respective trades, which I wish to point out in alluding to the comparative unproductiveness of the docks. The Waterloo and the Victoria Docks are appropriated to the American trade. The further extension of these plans would entail a continuation of rates upon the trade, which

Land and conveniences for trade.

are very onerous, without affording them that fair share of the accommodation which I think they deserve. It is propounded at our Committee by Mr. Holme, who is a great advocate of this scheme, if not the promoter of it, that his great object is to find land and appliances for trades. Now the United States interest would certainly be injured by the appropriation of that land for their accommodation, and I see nothing for it but a continuation of the straitened accommodation they are at present put into; because they are not allowed a fair share of the accommodation as it now exists, and it must entail upon them still the high rates which they now pay. The American Chamber of Commerce has not met as a body—they have not met to discuss the scheme; the opinions I have stated were as general as my communication with them extended. I have never suggested to them the importance of strengthening their representations by themselves expressing an opinion. I have been remiss in that. It never did occur to me to call for it. I consider that the American Chamber of Commerce represent the general commercial interests, for which Liverpool is merely the port of transit,

more so than any other associated body in the town. They are the agents of mercantile houses situated elsewhere, as well as Liverpool merchants; they combine, generally speaking, in that trade the agency of foreign houses, as well as the business of merchants on their own individual account. It is very difficult to say which they were chiefly. Messrs. Brown's house is much more a house of agency than on their own account; they are more in the position of bankers; they would not represent in proportion to their business the same amount of tonnage. I see no difficulties at Birkenhead as regards the market for the cotton trade. They could, with great convenience, bring the samples from Birkenhead to Liverpool and exhibit them there; and then, if they have the same facility for carrying away the produce from Birkenhead they have from Liverpool, there could be no difficulty. The question of the market affords no difficulty whatever in the Birkenhead Docks becoming a large emporium for the cotton trade. I think it would be for the general interests of the trade, if we could make available Birkenhead as an addendum to Liverpool, and an assistance to it. No good will arise from its being in opposition; it must be detrimental to both of the estates. *W. Barber*, 20 April, 1855.

It has always been supposed that the principle of competition was for the general benefit, but I would rather give the preference to having them under one management. I will illustrate it by the difficulty of moving light ships, and applying particular portions of trade; they could do that better. If a vessel is empty in Liverpool, occupying a dock waiting for a berth, they could take her to Birkenhead, or vice versâ, which would not be possible if there were a competition. I think the economical and effective management of the docks as united would be sufficiently secured by the public nature of the trust which has control over them. My position as a Dock Committeeman renders it rather difficult to answer a question as to any alteration in the system by which the Dock Estate of Liverpool is now managed, which would give greater protection to the public than that which now exists. I have always expressed a strong opinion upon the constitution of the Dock Committee, and some time about the year 1848 I was a member of a deputation of the associated bodies from Liverpool, and waited upon yourself at the Board of Trade. It was for the purpose of getting a locus standi to alter the constitution of it, and then their views were more sweeping than they were afterwards in 1851; but I have certainly a strong opinion that the influences of the town of Liverpool are brought to bear upon the Dock Estate in a manner which is very detrimental to the interests of the public at large. My opinion is, that that body should be separated completely from the influences of the town; that they should be all elected by the ratepayers, and not by the Town Council. Those members of the Dock Committee who have been elected by the Town Council, and those which have been elected by the ratepayers, have not separated themselves in a body on the management of the estate. I am not aware that the divisions of the Committee would point to any

One management preferable to competition.

Constitution of Dock Committee.

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sectional differences between them,—any distinction between the conduct of the members elected by the ratepayers and those elected by the Town Council,—from which it might be suspected that the one looked more to the local interests of Liverpool, while the other looked more to the general interests of the trade. In matters of discussion the question of the actuating influences of the members sent there by the Town Council has been often broached. We have always supposed, and I think they have admitted, that they have to look to the interests of the town and its trades, as well as the general interests of the Dock Estate. There is one gentleman who is a very influential member, and is elected by the ratepayers, who has stated to me, in making a comparison between the importance of the United States trade and the timber trade, that although the timber trade, according to my calculation, paid but about one-ninth of the dues, and the United States trade paid one-half, the great advantages to the town from the greater amount of labour or artisan work which this timber trade brought, should be considered. Now if he adduces that as a consideration, or as affording a right for consideration on the part of the timber trade, it must influence him in his votes, and yet he is elected by the ratepayers. I think all persons directly interested in the expenditure ought to have a voice in the management of that estate, wherever they may live. There is an association called the Chamber of Commerce, which is supposed to represent the whole of the commercial interests of Liverpool, and I think gentlemen here who know more of its constitution than I do will put me right. The East India Association, and the Brazil Association, are supposed to represent those particular trades, and it was understood that they should all be represented in the Dock Committee at the time of the alteration of the Dock Act on the last occasion.

Influence of local interests.

I stated that I objected to the arrangements for the steam trade. I do not consider that there is a single dock already made, nor one projected, which is at all adapted to the steam trade; my reasons for that are, that I think a steam dock should have two entrances, or an entrance and an exit, and they require a narrow dock for that purpose; they state to us that they require a quay berth always to load and unload. A gentleman who has one side of the Huskisson Dock appropriated to him, has stated that the Huskisson Dock would do as well if it were half the width. If, therefore, we could make a dock equally available for the steam trade with half the width, it would be much for the advantage of the town. It should have an entrance at one end, so that they need not swing with a large vacant space of water in the centre. I think a better distribution of the existing docks might be made. I do not think that there is a single existing dock which is adapted for steam, nor is there one among the projected docks. In the Trafalgar Dock they claim a quay berth and no other. The harbour master, in computing the capacity of the Trafalgar Dock, puts it down at 5000 tons. Now the adjoining dock, which is of rather less acreage, has a

Docks not suited to the steam trade.

capacity for 15,000 tons before it is full; that is the difference between the appliances for steam and the appliances for the ordinary trade. I think the American trade wants many docks. It wants a great deal of accommodation in the very centre of the town, instead of being sent from the Brunswick Dock to the Huskisson Dock, and all about the town. All the different trades, including the steam trade, are represented in the Dock Committee to a certain degree; not in a proper proportion, I think. *W. Barber*, 20 April, 1855.

Every year the bonds are falling in; whether they are renewed or paid off is a matter of arrangement between the holders and the Dock Committee. The objection I have to largely increasing the debt, because there is a large amount of bonds to be paid off or renewed, will operate in every future year to come if we are to have dock extension, but it would operate to a much less degree if we did not incur an expenditure of 45,000*l.* or 50,000*l.* a year without any income derivable from it, which is proposed by this scheme. I am not to be supposed to be opposed to dock extension, but if we went on to improve it on our own property we could stop at any moment; but how we are to do so under the proposed plan, unless the future income realizes the sanguine expectations of some members of the Dock Committee, I do not know. Renewal of bonds.

Harold Littledale, examined by Mr. Goldsmid. *H. Littledale*, 20 April, 1855

I am a member of the firm of T. and H. Littledale; our firm carries on one of the largest businesses as brokers in the country. I am a bondholder of the Liverpool Dock Trust, for myself and for my family, to the amount of 18,000*l.*; I have signed the petition against the Bill. I have carried on business in Liverpool about thirty-five years, and our business has been very extensive during the whole of the time. I have had great opportunities of acquiring knowledge respecting the trade of the Mersey and its requirements, probably no one more so. My attention has also for the last ten years been directed to the question of dock accommodation; it has been a sort of hobby of mine. On one occasion I was asked to become chairman of the Liverpool Dock Committee, but I declined; I do not interfere in public business at all. As regards my interest in Birkenhead, I have a preferential bond of 500*l.* of the Birkenhead Dock Trustees, and seven or eight shares in the Dock Company; that is the whole amount of my interest in those docks. I have a house or two in Birkenhead, worth about 1000*l.*, perhaps. My reason for petitioning against this Bill was from the dangerous position the Dock Estate is bringing itself into. I am of opinion that if this Bill should pass, and should be carried into effect, the interests of the Liverpool bondholders will be endangered. Much reference has been made to the fact, that only two bondholders have signed the petition against the Bill; the reason is, that I did not like to ask any one to sign, because there was a chance of the Bill being withdrawn, or Parliament throwing it out, and I did not wish to bring any discredit upon the estate. If I had called Bondholders ignorant of proceedings.

H. Littledale, 20 April, 1855.

the bondholders together, there would have been women and people living in the country, who are not well acquainted with these things, and it would have brought the estate into greater jeopardy than I should have liked to have seen it, by there being a call for money. Many of the Liverpool bondholders are unaware of the effect of this Bill; they consist, to a large extent, of people in the country with trust money; they have had their interest paid regularly, and they are very fond of that security; and any alarm would be very detrimental to the Dock Estate of Liverpool, and being a Liverpool man, I did not wish to do that. Since this scheme has been brought forward, I have known several instances of people who would have been willing to lend money, but from what has passed they do not now think the security sufficient. Had I called the attention of the bondholders to the subject, this petition would no doubt have been numerously signed. I should have been sorry to do it. During the next seven years they, the Liverpool Dock Committee, will have to pay off the whole amount of 5,284,000*l.*, because they do not borrow longer than for a term of seven years. The amount to be paid off this year is 1,284,000*l.*, as is stated in their printed report. The power of the Liverpool Dock Committee to meet their liabilities depends upon their being able to re-borrow the money as it becomes due. If this Bill is passed, and an attempt is made to carry it into effect, whether the Trustees will have difficulty to reborrow the money they will have to pay off, will depend, no doubt, a good deal upon the state of the money market, and the interest they offer; if they offer a high interest, 4¾ for instance, which is an amount a great trust like that of Liverpool ought not to give, I think they may get the money; but if there is any alarm they will not get it. When my bond is due, or anybody else's, if we cannot get the money we have no remedy; we cannot say or do anything, and may whistle for our money. I think they would, under the most favourable circumstances, have to pay more than the average rate of interest they have hitherto paid. My attention has been directed to the fact, that the calculations with reference to this Bill are founded upon the surplus income of the year ending June, 1854, of 69,000*l.*, and I was astonished to see it; that cannot fairly be considered as anything like the average amount of surplus income of the Liverpool Dock Trust. I take their average surplus income for the years 1848, 1849, and 1850, from Mr. Turner's own statement, as 19,824*l.* 13s. 1d. It appears that the average income for the years 1851, 1852, and 1853, was 16,718*l.* As to the present year, from the acknowledged deficiency there already is, the increase to charges of interest and of one thing or another, it will be as much as they can do to pay their way. There is only a certain sum of money to be received from the trade which comes, whether the works are more or less. If new warehouses are brought in, of course it will make some increase to the income. The average gross income for 1851, 1852, and 1853, is 318,191*l.* 16s. 6d. Deducting the cost of management and repairs, as given by Mr. Turner, and as charged

Surplus of 1854 excessive.

last year, it amounts to 207,238*l.* 2s. 1d. The cost of management is 110,953*l.* 14s. 5d. The debt, as stated by Mr. Turner, to be provided for, was 5,284,000*l.*, and taking the interest at 4¼ per cent., which is the average, but which is getting greater every day as they renew their bonds, it is 224,570*l.*; that gives 207,238*l.* to meet 224,570*l.* There is a deficiency of about 17,000*l.*, according to that; there may be some little taken credit for, from some of the warehouses now being built, but they are not finished yet. I have made another calculation, giving credit for the net income derived from the Wapping Dock, and the Stanley and Wapping warehouses which are not completed. I have adopted Mr. Turner's estimate; but I will not give credit for 7 per cent. upon the warehouses. I have taken the dock at 12,460*l.*, and added that; I have further added what I believe may be the net income from the Stanley and Wapping warehouses. I believe 5 per cent. is much nearer the mark than 7 per cent. Being a large warehouse owner myself, and having had a large experience that way, and it being such a fluctuating property, I think 7 per cent. is a very high interest to charge for it. I have taken 5 per cent., that is 12,500*l.*, which gives as their total net revenue 232,198*l.* 2s. 1d. I deduct the interest on the bond debt of 5,284,000*l.*, which is 224,570*l.*, and the further interest on 80,000*l.* which it will take to complete those warehouses; that is about 4000*l.* a year more, and I get a net surplus revenue of 3628*l.* 2s. 1d. when those works now in progress shall come into operation, and assuming the working expenses do not increase, and that the rate of interest can be taken at 4¼ per cent. The interest is taken at 5 per cent. on the 80,000*l.*; the rest is taken at 4¼. The result turns out that, instead of a total security of 6,131,740*l.*, they will only have a total security of 3,840,000*l.* I have taken the income from the warehouses at 5 per cent. instead of 7 per cent., which upon the cost of the warehouses is an exaggerated computation. The public warehouses in Liverpool are only about one-fourth or one-fifth; I think nearly four-fifths are private warehouses. When there are not any goods in port, they work them for a mere nothing; I have known them only pay the rates upon them. If at any time there is not a large stock of produce in the port, they will take anything rather than not let them, and very often they do not pay 2½ per cent. I have considerable warehouse property, and I rent a considerable quantity too. During the last seven years, with the exception of two very short periods, the existing warehouses have been sufficient for the trade in a general way. Sometimes, when an import is delayed by a long continuation of easterly winds, and there is a large importation of grain all at once, there is a deficiency. I should think thirty per cent. of the warehouses were empty now; a greater proportion was empty during the months of February and January last. In those months there was a long continuation of easterly winds; there were no imports, and everything was drained off. The want of warehouses in the case mentioned has oc-

H. Littledale, 20 April, 1855.

Estimate of income and surplus.

Sufficiency of existing warehouses.

H. Littledale, 20 April, 1855.

curred a good deal from the accumulation of grain; that occurred more frequently before the alteration of the corn laws, because then there was a sliding scale, and you used to import very low, and hold on till the duty was taken off. Corn room is charged at three farthings to a penny per square yard per week; that is equivalent to from 2s. 6d. to 3s. for a hundred quarters. For cotton it is from a halfpenny to three-farthings per bale per week; at a halfpenny a bale it would be barely five per cent. to the owners. Some warehouses have been built of late years at Liverpool, I do not think there have been a great many; they were such a bad property, people gave over building them. These dock warehouses being put up have stopped any private warehouses being built. I have known several cases of great depreciation. I know many of my friends who formerly had their 500*l.* a year for their warehouses, have now gone down to 150*l.* The warehouses which have been erected will be obliged to be applied to some other purpose some of these days. There is a very great increase in the proportion of goods which go direct from Liverpool to the interior without being warehoused at all. The increase in the goods stored at Liverpool is much less proportionately than the increase of the imports. The cotton market being established in Liverpool, there would not be the least difficulty in cottons being stored in Birkenhead; at present you can store them cheaper in Birkenhead than at Liverpool; being stored at Birkenhead will not prejudice the sale. I sometimes sell 200,000 bales of cotton a year, and it is sold by sample; it is as easy, or more so, to go and fetch a sample from Birkenhead to our own office, than to go to the north or south end of Liverpool. Cotton stored at Birkenhead will be as easily saleable at Liverpool as if it was stored at Liverpool itself. The reason for any difference now, is that they have only two or three small warehouses; Birkenhead is not finished; it is in a state that there is no accommodation there for several things yet, but if it is finished as it is laid out you will have greater accommodation, and cheaper, for your warehousing. You will have railways which will come into your warehouses, which they do not in Liverpool; and you can send your goods to all parts of the world just as easily as you can do from Liverpool, without cartage and several other charges.

Warehouse rent.

Convenience of Birkenhead for cotton trade.

Saving of charges.

Monday, 23rd April, 1855.

THE RIGHT HONOURABLE HENRY LABOUCHERE IN THE CHAIR.

Harold Littledale, further examined by Mr. Goldsmid. *H. Littledale, 23 April, 1855.*

It is a matter of indifference, as to the bulk of the goods which are sold by sample, whether they are stored at Birkenhead or at Liverpool. The Exchange may be situated at or about the centre of business in Liverpool; from the Exchange to the entrance of the Birkenhead Docks is one mile, the distance to the north docks is 2¼ miles; it is pretty nearly in a straight line that you would go, that is to the Wellington Dock; the other docks proposed are much further on. To a person desirous to buy on the Liverpool Exchange goods which are sold by bulk, and look at them first, one would be about as convenient as the other. The quantity of additional dock accommodation required in Liverpool has, to a certain extent, been exaggerated. The dock accommodation required is for large ships; ships drawing a great depth of water cannot be conveniently accommodated upon the Lancashire side of the Mersey except at high spring tides. I heard Mr. Barber's evidence, and I concur in his opinion as to the expediency of the Liverpool Trustees re-arranging and improving their existing docks before they make new ones; by means of such a re-arrangement and improvement considerable additional accommodation could be provided. I also concur in Mr. Barber's opinion as to the expediency of concentrating the dock accommodation of Liverpool. The proposed north dock scheme is quite contrary to the principle of concentration. I concur in the opinion expressed by Mr. Barber, as to the expediency of using for docks the land which already belongs to the Dock Estate before acquiring new land. I am a member of the Chamber of Commerce; I went with the deputation to the Dock Committee; I heard Mr. Holland's evidence upon that subject, and concur in his statement as to what passed upon that occasion. The deputation expressed to the Committee the propriety of further engineering advice before the scheme was determined on. The examination by Sir William Cubitt, after the plans were deposited, was not the kind of examination that the Chamber of Commerce thought proper and sufficient; they had in contemplation engineering advice upon the whole question of dock accommodation, taken in connection with the state of the estuary generally. Birkenhead and the whole estuary ought to be taken into consideration; we want a person to survey the whole of the north shore and the south shore, without consideration to Birkenhead, more than anything else; but Birkenhead being in existence we think it should be considered. My attention has been directed to Birkenhead a very great deal. I am of opinion that accommodation could be afforded at Birkenhead for the traffic of the Mersey, which could not

Re-arrangement and concentration of docks.

Whole estuary to be considered in reference to dock accommodation.

H. Littledale, 23 April, 1855.

be afforded by any expenditure upon the north dock scheme; you could get a depth of water and shelter which is impossible upon the other side of the river. The Liverpool Dock Trustees, being a public body, ought to consider what could be done on both sides of the Mersey, instead of the Lancashire side only. Liverpool is not a place of consumption, it is a place of transit; and I do not think therefore it is right that the Dock Trustees should think of Liverpool alone; they ought to consider the commerce of the country generally. The great bulk of the Dock Committee think they are sent there to represent the interests of Liverpool, and not the interests of the Dock Estate, and that only; there are three or four of them who take a different view; they conscientiously and honestly consider themselves to be sent there to do so. There is also a very great prejudice in that body against Birkenhead. If they had considered the capabilities of Birkenhead for accommodating the trade, they must have come to the opinion that those capabilities are very great. If the Birkenhead Docks were complete, and the Liverpool Dock Trustees improved their own existing docks, and made use of the land in their possession, the acquisition of any new land by the Liverpool Dock Trustees would be only overburdening the estate with additional cost. For less than two millions the Dock Committee could acquire the property of the Birkenhead Trustees, and complete the works, and acquire a water and land space of about 200 acres of each; they would acquire for that the Herculaneum Estate on the Lancashire side. In my opinion, that would be much more beneficial to the public than a similar outlay on the Lancashire side. The deep-water entrance at Birkenhead is the great point, the essence of everything—the deep water and the shelter which you get there. In the same amount of dock space much more trade could be carried on with a deep-water entrance; I consider a deep-water entrance equivalent to a greater comparative space. Mr. Warren told you that when his large ship came in, from not being able to dock she remained eight days in the river on one occasion. As such a large increase of trade is frequently contemplated, and ships get larger every day, if there were twenty of these large ships waiting in the river eight or nine days, and all were to go in together, there is not space enough; whereas if they could have docked one after another they would have been discharged, and it would have been equivalent to half as much space again almost. With the same space, more ships could be discharged if there were deep-water entrances; and besides that, from having ground which has not been built on, you are able to make the most convenient arrangement; you may have a shed, and behind that a warehouse, and in that way you may discharge a large vessel in three days. I heard the evidence of Captain Eldridge and of Mr. Wilson Green, and I concur in their opinion as to the danger of docking ships at the north end; that has been my study for the last year or so, and I concur in what they said—particularly in what Mr. Green said, who has had more experience than any man in Liverpool. Similar opinions have been stated by a great

Interests of Liverpool consulted.

Deep-water entrance at Birkenhead.

many other American captains, who are now abroad. Vessels cannot dock at the north docks in a strong north-west wind, and they do not attempt it. I should like the word "accident" defined; I think I heard it said there had been only one accident in so many years; if they will define what an "accident" means we could understand it. I have several letters here from American captains, which I can read if the Committee please. In the last week I met a captain of one of McIver's packets, the America; she came in on Saturday night, and she had to sail on the following Saturday; that vessel had to lie in the stream all that time, she had to pay dock dues upon the cargo, she had the whole of the cargo to take in by flats. I asked the captain this last week if there was any difficulty in docking at the north docks; he said yes, they had in the case of the Alps, which they wished to remove from Wellington to the Huskisson Dock; he sent down to the dock master, who gave him for answer that they could not move her that day, they had had such difficulty in closing the gates, and they were not open again that day it blew so hard. *H. Littledale,* 23 April, 1855.

By the Committee.—The advantages of the Birkenhead works would be very much greater than can be derived from the works proposed by this Bill. I think the Liverpool Dock Committee consider Liverpool too much, to the exclusion of the Cheshire side of the Mersey. I think that could be remedied by a different constitution of the Dock Trust. I would have a paid chairman appointed by the Board of Trade, or some body which is not subject to local influence at all. I think, for the best interests of commerce, Liverpool and Birkenhead should be incorporated in one borough; the whole should be under the management of one Board of Trustees, and my idea is that the board should consist of twelve ratepayers, and twelve belonging to the Corporation. Suggested Dock Committee.

The Dock Committee, in giving their surveyor orders to make a survey, did not say to him, Survey the river round, but, Just survey on this side of the water. I confine my observation to their preference of the Liverpool side of the river, over the Cheshire side. The Dock Committee have done their duty themselves very well; they are returned by a constituency who have nothing to do with the Cheshire side. I am speaking only of the preference of the Lancashire side over the Cheshire side, not of the general management of the docks. The interests of Liverpool, as a port of transit, and the rest of the country as interested in Liverpool, through which their consumption is supplied, ought to be exactly the same. If Liverpool people would get over their prejudice of the Cheshire side of the river, and they will work together, I do not think the docks could be better managed. In my opinion, it would be advantageous that the whole dock system of Liverpool, whether upon the Cheshire or the Lancashire side of the river, should be under one management. There is no benefit to be derived from competition in this particular case, which would compensate for the disadvantages of a divided management, but quite the contrary. There are two or three Preference for Liverpool side. One management preferable to competition.

H. Littledale, 23 April, 1855.

things on each side; there is a particular kind of coal which is suitable for steam purposes abroad, upon one side, and another kind upon the other. If the docks were under the same management, and the same dues, and all were regulated together, a vessel might come and take the cargo which was best suited to her. If this amalgamation were to take place, there is no alteration in the constitution of the Dock Trust which would be desirable, except as to a paid chairman; I should like to see a proper person appointed by the Board of Trade, not having local interests. I would incorporate Birkenhead and Liverpool for municipal purposes generally. I would make them one town; such an amalgamation would, I think, be acceptable to Birkenhead, and to the generality of people. The population of Birkenhead is very rapidly increasing. I would still allow the Corporation of Liverpool to have a large voice in the Dock Committee, for this reason: the ratepayers are a body here to-day, and gone to-morrow; they have no interest in the general welfare of the town; it is their object to have the rates low as long as they are there. In the Dock Committee the members elected by the Town Council of Liverpool, and those elected by the ratepayers, have acted together pretty well—sometimes there is a difference. The Dock Committee, I think, ought not to have the whole thing, and to have none of the Corporation in. I think they ought to be half and half, as at present. I think it desirable that the chairman should be a paid officer appointed by the Board of Trade, entirely distinct from the members of the Committee, without any local interest whatever. I should prefer that to having one of the first-rate merchants connected with Liverpool, deeply interested in commerce himself, serving in that capacity; though he might do the best he could, still local interests would have a certain effect upon him. Liverpool and Birkenhead ought not to have distinct interests. I do not complain that the management of the Dock Committee has been a bad management, or a corrupt management, in any way; the Birkenhead interests have not been sufficiently taken into consideration; they have had a spite and jealousy against Birkenhead, and have ignored it. Birkenhead, being the only place which can accommodate large ships, ought to be made the most of.

Amalgamation of Birkenhead and Liverpool.

Birkenhead ignored on dock questions.

Lieut. J. Hookey R.N., 23 April, 1855.

Lieutenant James Hookey, R.N., examined by Mr. Calvert.

I am an officer of the Royal Navy, and dock and harbour master at Birkenhead. I have known the Mersey upwards of twenty years. I commanded a vessel in the East India and China trade for many years, generally from the Mersey, sometimes from London. I was appointed to my present office of harbour master by the Dock Trustees of Birkenhead. It has frequently happened to me to be detained in the river for want of sufficient water to enter the Liverpool Docks. Upon one occasion I was detained to the extent of five days in the river; I arrived upon that occasion at the commencement of the neap tides; it was in the year 1844, the last time I went to sea; ships then were not so large as they

Detention in the river.

are at present, generally speaking. I commanded a ship then, which was considered a large ship, and she was under 600 tons; now we have ships resorting to the Mersey of more than 2000. They exceed now, in many instances, 22 feet; my vessel of 600 tons drew 19 feet, which was a great deal for her size; that was a heavy draught at that time. Every neap tide a great many ships are detained in the Mersey for want of water to enter into the existing docks on either side. The timber ships try to make two voyages in a year; they start upon their spring voyages in the month of March, or the beginning of April; they go up the St. Lawrence; they then get to the St. Lawrence as soon as it is open. They generally return about the end of July or August from the first voyage. It is of great importance to them to get despatch after the first voyage, that they may commence their second voyage, to save the ice in the St. Lawrence on their return. The second voyage is more dangerous as it approaches the autumn; the insurance will be greater, and the loss of a few days is a matter of very great importance; to get the first voyage complete, and commence the second voyage, is of great importance to save the open navigation of the St. Lawrence. Facility of ingress and egress, and convenient storage, are of great importance for the purpose of commencing the second voyage. The detention of a ship in the river gives rise to heavy expenses; there will be expenses in maintaining the crew; whereas, if the ships entered the dock, they would be immediately discharged, and their wages cease. They have to pay boats to communicate with the shore, and to pay a pilot. An underwriter will not be responsible for accidents unless they have a pilot on board, and then there is the interest on the ship and cargo in addition; we have had several instances of ships going into the Birkenhead Docks, and paying extra rates, rather than lie in the river. There is the danger of collision in the river, there is such a traffic up and down; and not only so, but there is such a strong tide in the Mersey, and in the event of its blowing a gale of wind, it is with great difficulty that an anchor will hold. There have been instances of ships driving from their anchors and getting foul of other ships, or going on shore. There are a great many ferries across the Mersey; the boats of the Woodside Ferry run all night long: as fast as the boats can go from eight o'clock in the morning till seven o'clock at night; and then every half-hour till twelve, and every hour after twelve till five in the morning. The other ferries are, on an average, every half-hour. The first ferry is at New Brighton—then there is Egremont Ferry—that is every half-hour—then there is Seacombe Ferry every half-hour, and Woodside Ferry about every ten minutes, and there is another ferry, Monk's Ferry, which is not shown upon the map. Then there is Birkenhead Ferry, and above that is Tranmere Ferry, and the Rock Ferry, the New Ferry, and the Eastham Ferry, as well as the boats to Runcorn. I think there are ten ferries altogether. The large vessels frequently pass Birkenhead, and go up to the Sloyne, about a mile and a half above. In very fine weather they would not, perhaps, go to the

Lieut. J. Hookey R.N., 23 April, 1855.

Peculiar importance of despatch to timber trade.

Cost of lying in the river.

Ferries in the Mersey.

Lieut. J. Hookey R.N., 23 April, 1855.

Sloyne, but it is the best anchorage ground; and if they are likely to remain two days, or it is bad weather, they will go on to the Sloyne, from its being more out of the way, and there being less chance of collision, and its being better holding ground. Large vessels having come into the river, if by reason of the weather they cannot go into these docks, go up to the Sloyne and have to be brought back again, if they intend to dock at the north end of Liverpool.

The following Table shows the number of days in the present year on which vessels of the specified draught of water would be prevented entering, or leaving the proposed dock, or any existing dock at Liverpool.

1855.	Ships of 18 feet.	Ships of 19 feet.	Ships of 20 feet.	Ships of 21 feet.	Ships of 22 feet.
January	0	4	10	14	20
February	3	7	9	12	15
March	4	8	10	13	16
April	5	7	9	13	14
May	4	7	10	13	16
June	3	5	8	15	20
July	1	4	8	16	23
August	4	7	12	15	18
September.....	5	9	10	14	15
October	6	9	11	14	18
November.....	4	5	9	13	17
December	3	5	7	12	18
	42	77	113	164	210

This table is calculated to be very near the draught of water of the ship named; it is always prudent to have a few inches under her bottom. If the wind is blowing strong from the west, there will be a rough sea over the sill. If a vessel drew 22 feet, I think the dock master considers there ought to be a foot more than the ship would draw; if there was a heavy sea you would require more. The ship will not go over the sill so fast as the wave goes over the sill. If the ship is riding on the top of a wave, you must calculate what the depth will be in the trough, and must get a sufficient quantity of water below the trough of the wave, instead of below the top of the wave. The smaller vessels are getting done away with very fast; the vessels which are increasing in number are large vessels; it is not uncommon, now, to range from 1200 tons to 2200 tons. The greater portion of the timber goes up the Mersey by water, and thence by canals to its destination. It is put on floats, many of them sometimes are strung together. In a strong tide-way they must be unmanageable and unwieldly; they are towed by one steamboat, and perhaps there may be eight or ten of them attached to each other. If the timber trade were at the north end, and had to pass all the docks, the inconvenience would, I think, be greatly increased. They will have to cross the line which ships will have to take, having come in in heavy weather, and gone up to the Sloyne. It will be inconvenient in respect of those ships going up and coming back; and in addition to all that, they

Smaller displaced by larger vessels.

Inconvenience of timber at the north.

will have to cross the line of all the ferries, and the sixteen entrances to the Liverpool Docks, at right angles. The floats coming out of the docks at an early period of the tide must cross all the vessels at anchor and the ferries; a great many vessels go to the docks at a very early period of the flood-tide. There is no period of the tide when the floats would not be liable to meet with vessels entering or preparing to enter the docks. I apprehend they would always start the timber float at flood-tide, just when the ships are entering the docks. There are a great many steamboats to Ireland, and to the Isle of Man, and to Scotland, all starting from pretty nearly the same point. *Lieut. J. Hooley R.N., 23 April, 1855.*

The exposure to the winds in the north docks produces inconvenience in every respect. If you look at it on the plan, you will see that, from the Rock Channel, it blows direct upon the wall, and the strong winds in the Mersey, which do the most mischief, are between west and north-west; there is a bank there, which, when it is dry, affords protection, but at half-tide it is covered, and then you are open to the whole sweep of St. George's Channel. In bad weather, I apprehend you could not get a timber float in or out from there, she could not live, but would be upset; the sea is too great there; a timber float is a peculiarly constructed thing; they place all the timber upon the deck; there is nothing below, so that she is very top heavy. I believe that inconvenience has already been felt in respect to the entrance to the Huskisson Dock. If it be necessary to move the timber trade from the south, there is no facility offered anywhere in the Mersey equal to those at Birkenhead. The entrance at Birkenhead is about two miles south of the most northerly of the Liverpool Docks, and it is protected from all westerly winds, which are the most prevalent winds in the Mersey. There is never a sea on the Cheshire shore—it is protected, in fact, from all winds; the winds which make Liverpool a lee shore, make Birkenhead a weather shore, and when the wind is the precise way, blowing from the eastward, the Liverpool shore is its protection. The ground rises to the east of Liverpool, and there is a complete protection against the easterly wind. No portion of the Cheshire shore is open to the sea at all; you cannot have the sea rise on the Cheshire shore, so that there will never be the inconvenience of a rough sea to prevent timber floats going in and out of the Birkenhead Docks; and they would avoid a considerable number of ferries concentrated at Liverpool, which make it very inconvenient that the floats should in any way come upon the Liverpool shore. There is a rule at Liverpool that, when the bell tolls, which is every half-hour, the ferry-boats, which have accumulated at the stage, must leave and go to their destinations—if there were a string of floats there it would not be possible to avoid them. On the Cheshire side, on the contrary, the ferries extend over a space of ten or twelve miles. We have already a large timber trade at Birkenhead. In Honduras mahogany we have done three-fourths of the whole trade of last year—we had 19 ships with mahogany—6012 tons, and I know that three-fourths

Convenience of Birkenhead for timber trade.

The Cheshire a protected shore.

Lieut. J. Hoobey R.N., 23 April, 1855.

of the whole number coming into the Mersey, came to Birkenhead this last year.

The Birkenhead Docks are in a very unfinished state at present; contracts have been made with Messrs. Brassey and Peto for their completion. The natural capabilities of the site of the Birkenhead Docks fit them particularly for the traffic of the Mersey. I know that they have the means of making very deep water entrances; there can be no doubt about it. And there is another very great advantage at Birkenhead; it is not alone that it is capable of affording very deep water entrances to the docks, but at the same time there is very little silt; we know that from experience. There is a small dock there, the only entrance we have at present, called the Morpeth Dock; that basin is complete. A mistake was made the other day in its being represented as forty feet in width; we have gates of fifty feet, and we admit ships of the largest class into those docks; we have had them upwards of 2,000 tons. The docks have been opened now going on eight years, and we have used a dredging machine only last autumn, for about three weeks; with the exception of that, we have never had occasion to remove one spoonful of silt out of it at all, and we never cleanse round about the gates. I think nothing can prove more strongly than this that the silt upon that side is of very minor importance, indeed, as compared with Liverpool. I can only account for it in this way, from the formation of the land. When the sea is turbulent and the wind blowing, it comes over the Burbo sand, and takes up a large quantity of sand, which, being held in suspension, goes to the lee side of the river, and they are constantly, at Liverpool, dredging the docks to keep them open. We have taken out very little silt indeed, and that only in the autumn of last year, out of one dock; the other docks we have not touched at all. The sill of the Morpeth Dock is five feet below the old dock sill, and we have had vessels in drawing twenty-two feet six, at spring tides. We have no inlet to the whole pool except the Morpeth Dock at present. Docking ships on a lee shore must always be more or less dangerous; you cannot get a vessel so near but you are very apt to touch the wall, and with a great sea there must be damage to the ship. The Liverpool side is very frequently a lee shore when they must dock; and there not being sufficient water over the sills in the southern docks, they must dock at the north. There is a bank called the Pluckington Bank which makes it difficult to dock at the Brunswick Dock; it is dry an hour and a half before low water, and eighteen inches above the dock sills it is opposite to now. We have had vessels come into the Birkenhead Docks for refuge, rather than remain in the river, though they pay a double dock rate, and were bound to go to Liverpool eventually; that of course has only been in cases where they were not waiting for water, but where the Liverpool Docks may have been full, that has repeatedly happened. The tug steamers lie quite close to the wall of the Birkenhead Dock; and in the Woodside Basin, so sheltered is it from bad weather, that I have known as many as twenty vessels lying there as a protection. Vessels having got into

Deep-water entrances at Birkenhead and little deposit.

Pluckington Bank.

the north docks of Liverpool are not safe then; I know there is a great deal of damage done in those northern docks after the ships are there; the Salisbury Dock is open completely to the sea, and when the gates are open, the vessels lying inside have a very great deal of motion. Whenever a low-water entrance is effected at Birkenhead, there will be the means of entry for very large vessels, not only at all tides, but mostly at low water, except for a short time at spring tides; but that would only happen once a fortnight. When the present plan which is contracted for is carried out, it will admit the largest ships which arrive in the Mersey, at every tide in the year, and generally speaking at every period of every tide; always at every half-tide, let the wind blow as it pleases; that would be a wonderful advantage. It is an advantage which nature permits not to be obtained on the Liverpool side. Last week I was in Birkenhead, and there was a very large ship called the Sierra Novada; that vessel, on the night of this day week, was attempting to enter through the Sandon Basin to go into the Wellington Dock, and for want of a sufficiency of water she grounded on the sill, and there she is still, a perfect wreck. She had 2400 tons of guano on board, and I see by the price current that guano is now selling from 11*l.* to 12*l.* 10s. a ton; at 12*l.* a ton it would come to 28,800*l.*; the ship, supposing her to be valued at 20,000*l.*, would make a total loss of 48,800*l.* That vessel, I am told, is so completely crippled, that it is a doubt whether it would be worth while to repair her. It was in consequence of their being unable to shut the gate; the tide goes in and out, and it is just like an open basin. They are taking the cargo out of the ship, and it is like mud—it is wholly spoilt. This power of entering at all times of the tide, gets rid of the necessity of having a number of entrances to the docks. The difficulty of obtaining an entrance at certain times of the tide, renders that necessary on the Liverpool side, and causes a great increase of expense; not only the expense incurred in the first instance, but there is an expense afterwards, in working the entrances and repairing them and keeping them clear. The companies keep steam tenders for the American packets for the purpose of taking on board passengers; Collins's line hire a boat; Cunard's line have two tenders of their own. When the Birkenhead Docks are completed, it will be possible to embark along the quay of the docks. The only reason they have for leaving the docks before they go to sea, is the fear that they may be neaped in the docks; they sail at a particular period, and if that period happens at a neap-tide they must leave the dock and go into the river, so that they may be afloat to leave at the time appointed for their sailing. In the Birkenhead Dock, when it is completed, a ship could not only leave at very high water, but at every period of the tide, so that when her time came to sail she would sail direct. Supposing a railway brought down to the Birkenhead Dock, a passenger might get out of the railway carriage into the ship. We have a railway down to the dock now; we ship a great quantity of coal now in that way; by that means a great deal of

Lieut. J. Hoobey R.N., 23 April, 1855.

Damage to shipping in the northern docks.

Numerous entrances supplied by one deep-water entrance.

Departure at all tides from Birkenhead.

Lieut. J. Hooker R.N., 23 April, 1855.

expense of storage may be saved; bulky articles cannot afford to pay for storage.

Operation of charges on business.

The rules about the payment of the dock rates tend to prevent our transaction of business. When a vessel arrives with a full cargo, many of those ships would require repair, and they must go into a dry dock or a graving dock; in the incomplete state of the Birkenhead Docks, we have no such accommodation to offer them. In another case, their destination may be such that they would require a general cargo to take out, and having so many shippers to fill the ship, they might object to the ship being at Birkenhead; under any circumstances, the moment the ship enters the Liverpool Docks they charge her the whole amount of dock rates, just as if she had been there in the first instance; they receive the ship, not as a coasting vessel from a port in the Mersey to themselves, but as though she had come from her original destination straight into their dock; she is treated as a foreign vessel in respect of paying the dock rates.

The Liverpool town dues.

The town dues of Liverpool is another unfortunate thing that we labour under; in the case of ships bringing their cargo there, they have to pay the town dues to Liverpool, though they may not have gone near the docks at Liverpool at all; whether coasting or foreign there is a town due levied upon all things shipped or discharged at Birkenhead, though the vessel may never have gone to Liverpool at all. The town dues amount upon the majority of things to about the same as the charge at Birkenhead for tonnage. If the payment of the town dues of Liverpool, and a ship having discharged at Birkenhead and going afterwards to Liverpool being treated as a foreign ship in respect of the rates, were removed, we could, in our present incomplete state, do a great deal more business for the benefit of the trade of the Mersey. Then there is another drawback. We have had cases in which ships in the Birkenhead Docks have been taking in a cargo, and they have found that the springs have been passing, and the cargo was not complete. Under those circumstances the ships have desired to go into the river, to save being neaped in the docks, and then to take in the last portion of their cargo; the doing that in the Mersey immediately inflicts upon them the penalty of the whole of the dock rates to Liverpool. The Liverpool authorities claim from them the dock dues for the whole amount which they would have had to pay if the ship had gone to Liverpool, though they only took in that very small quantity. The same as to lightening ships. In the case of the Sarah Sands, a large steam ship from Montreal, bound to the Birkenhead Docks, it was just the latter part of the springs, and they were in a great hurry, and they lightened this vessel in the river to enable her to get into Birkenhead Docks, and they brought the flat which so lightened the ship into the dock with the ship; but, notwithstanding that, the Liverpool rates were charged upon the ship. The Brazilian and Canadian ships were removed from Birkenhead on account of there not being a graving dock at Birkenhead to give them accommodation

Dock dues on vessels filling up or lightering in the river.

for their repairs, and when they went to Liverpool they had to pay double dock dues. *Lieut. J. Hookey R.N.*, 23 April, 1855.

The following Table shows the traffic received into the Birkenhead Docks:

Date.	Foreign.			Coastwise.			Miscellaneous.			Total tonnage exclusive of free tonnage.			Free Traffic.
	Ships.	Tons.	Rates.	Ships.	Tons.	Rates.				Ships.	Tons.	Rates.	
			£ s. d.			£ s. d.	£ s. d.					£ s. d.	Tons.
1848	100	16,287	611 9 7	174	16,945	292 9 7	55 4 0			274	23,232	959 3 2	156,000
1849	154	38,702	1218 6 5	346	60,128	484 18 7	210 4 10			500	98,830	1913 10 0	309,000
1850	288	58,867	1386 17 7	594	53,890	779 2 10	391 18 11			882	112,757	2557 19 4	270,000
1851	333	81,606	1641 3 0	572	45,793	511 8 1	316 8 2			905	127,399	2468 19 3	241,550
1852	376	118,563	1764 19 6	395	27,237	222 11 11	306 1 0			771	145,800	2345 12 5	252,670
1853	390	119,431	3609 19 11	614	37,614	400 2 9	500 1 6			1004	157,065	4509 4 2	305,070
1854	458	195,633	6083 11 1	860	53,549	596 12 11	543 5 6			1318	249,182	7223 9 6	314,810

The business of the year 1855 has increased upon 1854 as far as the year has gone; at Liverpool the business has been diminishing; at Birkenhead it has been increasing. River craft, which cannot find accommodation at Liverpool, very often come over to Birkenhead. We receive many coal flats and salt flats; rather than remain in the river, exposed at their anchors, they come into our docks for shelter. We do not charge upon the river craft at all. Tables of trade at Birkenhead.

The following Table is an account of the number of vessels, together with their tonnage, and the rates paid thereon to the Birkenhead Docks for the years ending 31st December 1853 and 1854:

Dock.	Foreign.			Coastwise.			Miscellaneous.
	Ships.	Tons.	Rates.	Ships.	Tons.	Rates.	
			£ s. d.			£ s. d.	£ s. d.
1853	390	119,431	3605 18 11	614	37,634	400 2 9	70 10 0
1854	458	195,633	6083 11 1	860	53,549	596 12 11	54 10 0
Increase	68	76,202	2477 12 2	246	15,915	196 10 2	
Decrease	...	...	...	...	...	...	16 0 0

Dock.	Graving Docks.		Gridiron.		Total.		
	Ships.	Rates.	Ships.	Rates.	Ships.	Tons.	Rates.
		£ s. d.		£ s. d.			£ s. d.
1853	19	209 10 0	119	223 2 6	1004	157,065	4509 4 2
1854	8	93 16 0	169	394 19 6	1318	249,182	7223 9 6
Increase	...	...	50	171 17 0	314	92,117	2714 5 4
Decrease	11	115 4 0					

Lieut. J. Hookey R.N., 23 April, 1855.

The following Table is an analysis of the above:

	Ships.	Tons.	£	s.	d.
Of the above Tonnage and Rates the Coal Trade supplied	194	74,507	1862	13	6
" Emigration	39	41,239	1030	19	6
" Salt	152	25,039	807	9	6
" Mahogany	19	6,012	250	13	4
" White Timber	31	14,044	585	3	4
" Canadian Steamers	10	9,283	374	10	9
" Brazil Do.	5	3,608	114	1	0
" Guano	8	7,182	359	2	0
" Bone Ash	17	2,829	141	9	0
" Coasters	860	53,549	596	12	11
" Graving Dock	8	...	93	16	0
" Gridiron	169	...	394	19	6
" Miscellaneous	...	11,890	611	19	6
Total received for the year ending 31st Dec. 1854	...	249,182	7223	9	6

The Morpeth Dock at Birkenhead has an area of three and a half acres, and we worked in last year 19,000 tons per acre with only one quay; with an additional quay we might add one third to that. We have not any warehouses upon that dock; they would not have increased the business that we have been in the habit of doing; it is principally in the coal trade and the salt trade. Hydraulic cranes would enable us to do still more. We have found no difficulty in doing 19,000 tons per acre in the Morpeth Dock, though it is now used as the entrance into the pool; it was intended as a temporary entrance, but it has been found so useful that I think it will never be shut up. Birkenhead will be of very great utility to the port of Liverpool, and I think there are great advantages in their being brought together; in some instances at least there are advantages. On the other hand, it would destroy a little wholesome competition. There is no doubt there would be a large trade brought there earlier than otherwise, if the Liverpool Docks and the Birkenhead Docks were amalgamated, because they would have the means of forcing a trade there directly. In the event of the present proprietors of Birkenhead finishing their scheme, it will command a trade of itself, no doubt. The very idea of their having deeper water there, if it was finished, would be of immense advantage. The great feature of Birkenhead is to have a deep-water entrance; that has never yet been obtained; and, therefore, Birkenhead has never had a trial of what it can do. I am perfectly persuaded that the moment there is a deep-water entrance effected there, there will be more trade than will be able to be done. I do not think there is a dissentient voice among the captains or owners of ships; they would not allow their ships to remain in the Mersey if they could get into a place of safety.

Advantage of amalgamation to the port.

Cross-examined by Mr. Merewether.

Cross-examination.

I have frequently given an account of the vessels between India and

China and the Mersey. I was examined in 1844, in 1847, in 1848, in 1850, and now again; and I have always told the same story. I have not now added any materially new facts to my previous evidence, except the increase of traffic at Birkenhead, which is very satisfactory. I have always been of the same mind as to the plans of Birkenhead, as regarded a deep-water entrance; as to how it was to be obtained we had a little difference of opinion; different plans, one of Mr. Rendel and one of Mr. Abernethy. They both contained a deep-water entrance, or I would not have sanctioned either. I was on one occasion a witness for Mr. Rendel's plan; and on a subsequent occasion a witness for Mr. Abernethy's, which was a mere deviation, never losing sight of the great feature of the deep-water entrance. The dues at Liverpool affecting the interests of Birkenhead are nothing new, since the time when it was conceived desirable to apply for the original scheme. There have been considerable reductions of rates, not applicable to Birkenhead alone, but generally, since that time. When the Birkenhead Docks were about to be opened, in 1847, there was a reduction of about 40,000*l.* a year upon the rates at Liverpool; I suppose with a view of deterring people from coming to the Birkenhead Docks. It so happened, however, that they made a reduction just at that time upon those bulky articles which were likely to come there. The dues upon cotton and salt were reduced 4d. a ton. The reduction was upon the cargo, which we did not receive then; there was no reduction upon the ship, I believe. A foot of water under the keel of a ship is generally sufficient for docking. I am told there were 24 feet of water when the Sierra Novada attempted to dock, and that she was marked to draw 22 feet 10 inches; that would leave 14 inches under her keel. The dead weight of her guano cargo might have made her bulge in her bottom. I have no doubt it must have been from some cause of that kind; a portion of her false keel might have fallen down. I am not reflecting upon any management of the Liverpool Docks. If these deep-water entrances at Birkenhead had existed, there would have been no possibility of that ship being destroyed, because there would have been so much water under her, that even with that difference it could not possibly have happened. It must have been some exceptional incident which prevented her getting in safely; there are only fifteen tides in the whole year which would give more water than that tide. I never heard that the mahogany importers at Birkenhead had applied to Liverpool for accommodation. I believe they are too well satisfied to be at Birkenhead for that; I am quite sure the principal importer is satisfied, and I saw him the day before I left. It quite astonishes me to hear it stated that they have applied to Liverpool for accommodation. Certainly it is not within my knowledge. I do not know that by this Bill it is proposed to deepen the sills at Liverpool. I do not believe they will be able to maintain them if they do. It would give them great facilities at Liverpool if they could maintain

Lieut. J. Hockey R.N., 22 April, 1856.

Deep-water entrance in every plan for Birkenhead.

Accident to the Sierra Novada.

Lieut. J. Hooker R.N., 23 April, 1855.

them; making them and maintaining them are two very different things. I know that it was attempted at the Clarence Dock to deepen the sill, and they could not maintain it. The table I have put in does not give the number of ships that trade with general cargoes; under the head of "Miscellaneous," it is 11,890 tons, amounting to 611*l.* 19s. 6d.; the great proportion of that must be for goods at large; we had a great many vessels with general cargoes. There were three vessels loading with a general cargo when I came away which never had been at Liverpool. A general cargo from Birkenhead would be generally manufactured goods. We have a communication from Manchester by railway alongside the ship, and those goods are brought from Manchester to the ship. Out of the same carriage which brings them from Manchester they are put into the ship, and that is done at the same rate that the goods are brought from Manchester to Liverpool, and cheaper, inasmuch as when they arrive in Liverpool they must be carted to the ship from the station, whereas at Birkenhead the charge is the same by the railway, and the railway delivers them to the ship itself. This is one of the facilities at Birkenhead. We are deeper at the Morpeth sill than the average of the docks at Liverpool; but can hardly call the entrance superior to Liverpool, because Liverpool has at some docks deeper entrances than that. The Morpeth Dock has repeatedly been quite full of ships. As long as the existing laws remain, and the Liverpool Trustees can claim a dock rate upon ships which go into the Mersey and take in a portion of their cargo only, or if when a ship arrives, and she discharges a small portion of cargo to enable her to get into the Birkenhead Dock, dues are to be charged by Liverpool, it does appear to be interfering greatly with the interests of those docks. I do not hesitate to state that, in the event of the Birkenhead Dock scheme being carried out in entirety, it will command a trade; there is no doubt about it in my mind. I do not think, assuming those dues to be exacted, Liverpool would be able to suppress Birkenhead. The deep-water entrance would command a trade. The failure of Birkenhead has been because they have failed in carrying out the scheme in its entirety.

General cargoes at Birkenhead.

Re-examined by Mr. Calvert.

If the authorities of Liverpool are invested with power to lay out a large sum of money, all the influence which belongs to Liverpool, judging from what has taken place before, would be employed for the purpose of making that money profitable at the expense of Birkenhead. There were not to be any wharfage rates at Birkenhead, nor were rates at any time levied upon goods at Birkenhead. A deep-water entrance is the essential point; if it could be made at Liverpool it would give great facilities. I do not think it could be maintained, for this reason, that it is a lee shore, and that the water passes over that great Burbo Bank, which is a loose sand; the water being in a turbulent state, and there being a current, the wind blowing keeps it in that turbulent state,

No deep-water entrances at Liverpool.

and it holds the sand in suspension till it meets with opposition, which opposition is the Liverpool shore wherever it happens to strike; the moment it comes there it comes in a stagnant state to some extent, and down this heavy matter drops; it cannot be carried over to the Cheshire shore. We know that that little Morpeth Dock does not require dredging, though it has been at work for eight years. I know they are dredging continually at the Liverpool Docks, and I can only account for it in that way, because it is on the lee side of the river, and it is subject to a very heavy sea. Mr. Hartley himself has given evidence that they have tried to make the entrances deeper, and could not do so, and he instances the case of the Clarence Dock; that was not so exposed as it is to the north. *Lieut. J. Hoskey R.N.*, 23 April, 1855.

By the Committee.—It would be fair, I think, in order to put the two sides of the river on an equal footing as regards dues, that in the event of a ship coming from Calcutta to Birkenhead, the Birkenhead people receiving the dock dues, and the ship finding occasion afterwards to go to Liverpool, the dues paid by that vessel should be equally divided between the two sides. I think, then, that in the event of a ship coming into the Mersey, and from any cause finding it necessary to lighten, to take any part of her cargo out of her, she should not pay to the Liverpool side dock rates, unless the ship enters the docks and receives accommodation from them. If she only confined herself to Birkenhead, after taking out a small portion of the cargo in the river, you should not compel her to pay rates to the Liverpool Docks. In the same way, vessels having left the Birkenhead Docks, and taken in a small portion in the river, should be exempted from Liverpool Dock rates if they never enter the Liverpool Docks. I think, in the event of there being an amalgamation of the docks on the two sides of the river, it would be better that they should be under one management; but I think, in justice to Birkenhead, it should be represented. It should return a member or two to the Dock Committee. The ratepayers of Birkenhead would require to be represented in the Dock Committee. The township is now represented in the Birkenhead Dock Trust. They are returned now in a similar way to the Council at Liverpool as Town Commissioners, by the ratepayers, to the township at large; and then out of that body they themselves elect four Dock Trustees, who form a portion of the Birkenhead Dock Trust. I think they would expect to continue, not in that proportion, perhaps, but in some proportion, to have a voice in the management of the estate. The only thing is, as I said before, that the expense would be increased. A great number of the residents at Birkenhead carry on business at Liverpool.

Division of dues between Liverpool and Birkenhead.

Representation of Birkenhead on the Dock Committee.

Captain Edward Young, examined by Mr. Hardy. *Capt. E. Young*, 23 April, 1855.

I am part owner of the ship Harvest Queen, of 1556 tons, and draught of water 21 feet when loaded; she was built for the Liverpool trade. I have commanded a ship to the port of Liverpool for the last eighteen

Capt. E. Young, 23 April, 1855.

years off and on: for the last six years I have come steadily to Liverpool. The principal docks I have been in are the Prince's Dock, the Waterloo Dock, and the Wellington Dock. I have been in the Sandon Graving Dock. I have tried the north docks. The north docks are well suited for our trade in that large class of vessel as regards convenience when you are in; but I have always a dread of going in in the winter season; difficulty is constantly occurring; it is unsafe for large vessels to dock there. The ship I have now is only making her third voyage. This time I was delayed from Sunday to the Sunday following. I tried to dock in the Wellington Dock the last voyage, and I knocked the carved work off my stern, and was very glad to get my ship off. I laid in the river ten days. Upon the first occasion I had no difficulty, only a detention in docking. About three weeks ago I drifted there with 75 fathoms cable and a patent anchor, and one of the largest cables that have been made. The holding ground generally is cut up all over, and it is unsafe; irrespective of the roughness, there is depth of water enough at the north docks at spring tides, but not at any other time. We have to wait, as a general thing, to get in, and even then, in rough weather, we cannot dock there. With the wind blowing heavy they cannot open the gates. The voyage before last I was detained three days myself; it was blowing so heavy I did not like to risk anything. In rough weather we go for shelter up to the Sloyne; that is under the shelter of both shores. There is deeper water at that part of the river than at the north docks. We ride there at low water with 5½ fathoms; I did so this last time. I agree with Captain Eldridge generally.

Detention in the river, and attempts to dock.

Cross-examination.

Cross-examined by Mr. Burke.

Accidents at north docks.

My ship is for goods as well as passengers; I have experienced difficulty in using the entrance into the northern docks; accidents are occurring daily in the winter season when there has been any wind; no accident occurred to my vessel, except a little carving, at those times. I prefer, though at a great expense, lying in the river rather than attempting to dock, in consequence of the risk; personally, I have met with no accident. A large number of vessels are docked there upon compulsion, because there is no other convenience for us; but they pick the times suited for it. When I remained a week in the river, it was from the want of water on the sill; the voyage before last, I laid there three or four days, from apprehended danger to my vessel; it was my intention to go into the north docks, but when I attempted to dock, the risk was too great; I was afraid to do so, and I had to re-book into another dock; the docks were not full at that time. The dock accommodation is insufficient at Liverpool because there is not water enough on the sills; we have to congregate together in the river, and we all want to go in with a rush. We have had a long spell of easterly winds recently, which detained vessels, then the wind changed, and they all came up together. I attach import-

ance to having a greater depth of water upon the sill. If a new entrance were made, with a deeper sill, I should think that a desirable end; but I think there is a more desirable end to be obtained; that would not make those lower docks safe even then. The gates do not open when it is blowing a gale of wind from the westward; and though the gates may be open, there is such a send of the sea that ships will not risk to go in. *Capt. E. Young*, 23 April, 1855.

Re-examined by Mr. Hardy.

The opening of the gates in such weather disturbs the ships a good deal inside the dock. Deep-water entrances will not obviate my objection to the north docks; they are still exposed. I have tested the inconvenience of waiting for water until a large number of vessels are gathered together, which of themselves would fill the docks. On the last voyage but one I was kept so long in the river entirely from stress of weather; a day or two after, a ship which arrived at the same time as myself received an accident; she tried to go in in bad weather, and received some injury; it is a common thing when there is any wind there.

Captain J. Biggs, examined by Mr. Goldsmid. *Capt. J. Biggs*, 23 April, 1855.

I am commander and part owner of the ship Empire; her tonnage is 1452. She trades between New York and Liverpool. I have been in command of her about two years. I am as well acquainted with the Liverpool Docks as most masters. I have experienced delays in getting into dock at Liverpool from the want of water, not only now, but ever since I have been with this ship; I have had to lie in the river seven to ten days. Delay occurs both in getting into dock and going out of dock. I have been delayed in the river a week or ten days; it is a week this time. That detention always occasions a loss of money from expenses, such as feeding the crew, keeping a pilot on board, besides the danger. We are obliged to go up to the Sloyne for anchorage when we can get a berth there. Ships are so long now, that it is a difficult thing to get a berth in the river, because the ships are all large, and they must all dock at one or two tides. I have frequently known damage to occur in docking ships in the north docks; in all the docks, in fact, the north docks particularly. I have seen the position of the proposed entrance to these new docks. I walked the whole line of the new wall this time. I was landed at the lower end of it. The entrances to the proposed new docks will not be safe at all; there can be no question about it, in my opinion. That wall, in my opinion, will be the same all the way, unless there is a canal made all the way along. The entrances will be worse the further north you go. The great difficulty arises from the shore being a lee shore. I was lying in the Stanley Dock Basin three days and three nights, with a gale of wind from the westward, in the ship Isaac Webb, of 1400 tons, and continually sending up to the town for bundles of

Delays in getting into and out of dock.

Risk in the docks.

Capt. J. Biggs, 23 April, 1855.

hay to put between our ship and the wall, and between our ship and the Tuscorora; we could not get out with the vessel because of the prevailing wind. Deep-water entrances are all-important now with the ships they have in the trade. The Cheshire side is altogether protected from the weather.

Cross-examination.

Cross-examined by Mr. Burke.

I have never been at Birkenhead except as a visitor. Deep water is of all importance for my ship. Assuming that there will be always a large trade at Liverpool, I should attach importance to any measure which would give a greater depth of water over the dock entrances. It is five years since I sent for those bundles of hay. My vessel was light, she got out of the docks into the Sandon Basin, and there came on a storm. If there were dock-room enough, vessels would not lie in the Sandon Basin unless they were caught there, as we were. Further dock accommodation is required at Liverpool, and if that could be obtained, with deeper water over the sills, it would be an advantage. I should like an entrance twelve feet deeper, so that I might come in at any time of the tide; what we want is an increase of deep-water accommodation.

Deep-water entrance.

Tuesday, 24th April, 1855.

THE RIGHT HONOURABLE HENRY LABOUCHERE IN THE CHAIR.

W. R. Coulburn, 24 April, 1855.

William Rushton Coulburn, examined by Mr. Goldsmid.

I am a merchant and shipowner at Liverpool, and have carried on business there upwards of twenty years. I am also a Trustee of the Birkenhead Docks .As a shipowner, I have had constant experience of the detention of ships in the river, from the want of water on the sills of the Liverpool Docks; also of the difficulty of docking in the north docks every neap tide with ships of a large draught of water. When it is blowing fresh, there is great difficulty with ships in the north docks in moving them; the dock master sometimes will not allow the ships to be moved. I had an illustration of it myself this last year. A ship of 1200 tons was chartered to sail on a given day, and in consequence of detention she was not able to get into the graving dock; afterwards, on coming into the graving dock, she could not be got into a berth, in consequence of stormy weather. It was the Pemberton; but that is by no means an isolated instance. Damage occurred to the Shooting Star, within my knowledge, in 1854; she was in the Huskisson Dock, and all her topmasts were carried away. The greater portion of the trade of Liverpool consists of the timber and cotton, the Indian, Australian, and

Difficulties in the north docks.

the American trades, carried on in vessels drawing upwards of nineteen feet water; particularly the timber trade and the India trade. The delay arising from the want of water on the sills of the Liverpool Docks acts more particularly against the timber ships; on account of their having to make two voyages at that season of the year in the St. Lawrence, the insurance is greatly increased, and indeed the difficulty of getting away at all is serious; sometimes they are detained six or eight days in the river. Every alternate week, ships drawing twenty feet cannot be docked. Such a deep-water entrance as is proposed at Birkenhead would be everything to the port of Liverpool. If the proposed plan at Birkenhead were carried out, there would be water for the largest ships that were ever known as merchant ships; they could come in at every tide at Birkenhead, and almost at all times of the tide. This ship which was lost on the sill of the dock, the Sierra Novada, was detained six days in the river. I saw her there waiting to dock. She was run foul of by a ship before she got into dock, and sprung her bowsprit, and received some damage.

W. R. Coulburn, 24 April, 1855.

Special inconveniences to timber ships.

I have been an importer of cotton. My own impression, from the experience I have had, is that if you provide a deep-water entrance, as is proposed, at the Birkenhead Docks, the trade will regulate itself. But I go further; my attention has been directed to the evidence given by Mr. Turner upon that point, and I certainly was very greatly surprised, because, as to cotton particularly, which is an article of import to the amount of ten to eleven millions sterling every year into Liverpool, not once in three hundred sales does anybody inquire where the bulk is; it is sold by sample in the brokers' offices in Liverpool. It is sold to be delivered in Manchester or Yorkshire, or the manufacturing towns generally. Nothing could be easier than for the secretary of the Birkenhead Docks to have an office at the Liverpool Exchange; an importer of cotton would walk into that office; he would say he wanted samples of cotton or sugar, whatever it might be; those samples would be provided for him, and sales would go on in Liverpool just the same as if the articles were at the north docks, or anywhere else. I cannot, for the life of me, understand why cotton cannot be delivered in Manchester quite as cheaply from Birkenhead as from the north docks at Liverpool, or any other docks. This applies to everything which is sold by sample.

Birkenhead suited for goods sold by sample.

Cross-examined by Mr. Webster.

Cross-examination.

There are about eighteen warehouses at Birkenhead; they are nearly empty; they would hold a good deal of cotton; there has been no cotton in them, but I can give you the reason. At present ships are loaded to discharge their cotton in the port of Liverpool, my plan would be that Birkenhead should be a part of the port of Liverpool. Birkenhead is not in the port of Liverpool in that sense; you have no right to deliver cotton at the Birkenhead Docks; it is not within the port of Liverpool.

W. R. Coulburn, 24 April, 1855.

It is the same Mersey, but in the sense of the law no one has the right to land cotton at Birkenhead. My panacea would be to declare that Birkenhead should be part of the port of Liverpool, or to relieve it from rates to Liverpool. The entrance to the Morpeth Dock is pretty much the same as most of the docks at Liverpool as regards depth; there is very little difference; we are better than some of the docks, but not better than the Salisbury, or the Huskisson, or the Brunswick. I have carried on a considerable business with the United States; I am not aware of its being attempted to establish a market at Brooklyn, near New York, and its having failed, but that would be a different thing altogether. This is not a question of two markets at all, it is only one market. I recollect perfectly well, when first the Albert Docks were built, and the warehouses were put there, there was the greatest prejudice against putting cotton there. All that, however, has vanished, and now people prefer putting their cotton into the Albert Docks; they have not had an opportunity yet of preferring the Birkenhead Docks. Sometimes, in the height of the cotton season, we have had a great want of warehouses at Liverpool, and then great depression has occurred again. With all that pressure we have had no cotton at Birkenhead; it all requires arrangement. First of all you have had the shipowners to consult, and the expense of taking over cotton when a ship is in Liverpool would be more than equivalent to the price of the cotton. The owner of the cargo might charter to go to Birkenhead. The Birkenhead float is not exposed to the same winds, nearly the same as the Huskisson Dock; certainly not. The Birkenhead float is very much open; the land at the upper part of the Birkenhead float is low land; there is a gully there. The Birkenhead float is not as exposed as the Liverpool Docks. I have crossed daily, and I have never seen anything like the same effect of the wind there as at Liverpool. The moment we get opposite the Birkenhead float we are comparatively comfortable, but when we are on the Liverpool side we are tossed about in a most uncomfortable manner. The Birkenhead float is not as open to the north-west wind as the Huskisson Dock. The Brighton Point is very little protection to the Huskisson Dock. A greater depth of water on the sills is the most important thing for Liverpool. In an exposed situation like the new north docks, the two feet additional would be almost counterbalanced by the sea in heavy weather. A ship cannot go as fast as a wave, and when she comes in on the top of it she might injure herself very much on the sill of the dock. I do not think there will be so much advantage from those two feet. There is an advantage in having two more feet, but in heavy weather a great part of it will be counterbalanced by being exposed to the full force of the wind and the waves of the sea, notwithstanding the basin; the sea will roll very heavily into that basin.

One market for the Mersey.

Shelter of Birkenhead float.

W. Titherington 24 April, 1855.

William Titherington, examined by Mr. Calvert.

I am of the firm of Gill, Titherington, and Gill, cotton brokers at

W. Tiherington 24 April, 1855.

Liverpool. We buy and sell cotton, at least 70,000 bales per annum; that is larger than the average business at Liverpool. Cotton is sold entirely by sample, in the sale rooms and offices which are concentrated, as much as possible, in and about the Exchange. The buyer does not require to see the bulk. The cotton arrives chiefly in large ships, latterly larger than formerly; they are getting larger every year. The general impression seems to be, that large ships will increase in favour, especially for cotton. Concentration of docks is most desirable for economy. Quay room is, of course, the very heart and soul of a dock—to discharge and reload, quay room is as essential, or more so, than water space. I am acquainted with the position of the Birkenhead Docks. I prefer the position of the Birkenhead Docks for the purposes of commerce, to any extension northwards at Liverpool. There is no reason why the business of the cotton trade should not as well be carried on from a storage at Birkenhead as from a storage at Liverpool. I am in the habit of selling a great quantity of cotton for the towns in Lancashire and Cheshire. Cotton brought into the dock at Birkenhead would fetch as good a price as at Liverpool. The present storage accommodation at Liverpool is attended with very serious inconvenience indeed. The extension of warehouse accommodation to the extreme north and south of the centre of business, which is the Exchange at Liverpool, has been so great, and the delays arising from having to send our men to those great distances are such, that we do not get through one half the amount of business we formerly did; our warehouseman, who has been with us for the last 30 years, says not one fourth. The business is all conducted about the Exchange, and we have a warehouseman who makes the arrangements for the delivery of cotton, and then he has to send a set of men, or various sets of men, wherever the cotton lies; and the distance is so great, and the time consumed so much, that we get through very little business compared to what we formerly did, and I should look with considerable alarm to the extension of warehouse accommodation, so far from the centre of business, as being very inconvenient. We should find Birkenhead more convenient than sending two or three miles north or south, especially with the Bridge End Station, which is to be made for the Birkenhead Docks. The course of our business is not so much to buy the cotton, we see to the delivery of the cotton, and that it answers to the sample. We are the brokers. The merchant receives the cotton and stores it; we sell it for the merchant; he delivers it. When we purchase for a party in the interior, we have to send our men to receive the cotton, and see that it answers to the sample; and then I complain that the distance is so great, and the time consumed is so much, that very considerable inconvenience is the result. If the cotton were brought into the Birkenhead Dock we should send to see that it corresponded with the sample, and then send it off to the consumer; the Birkenhead Dock would be convenient for the purpose. There is railway transit to all parts of Lancashire and Yorkshire, and water conveyance as convenient as from Liverpool,

Cotton sold by sample.

Loss from extension of docks to extreme north and south.

W. Tidkington 24 April, 1855.

because the water-carriers have the Mersey, and go to Runcorn to take it into the interior; and they could as easily go from Birkenhead as from Liverpool. I am a director of the railway from Birkenhead to Chester; the ship would come to the quayside; the railway would be on the quayside, and the goods can be taken direct from the ship, and put into a railway truck, and conveyed to the town where the consumers live. The merchant who has the cotton stored in the Birkenhead warehouses would send his order across to the Dock Trustees, and say, "Deliver such and such cotton to the bearer." In either case the cotton could be sent away, either by railway or by water; there are a great many water-carriers; one half, I dare say, is taken by water, but the water carriers have the same facility at Birkenhead as at Liverpool. At Liverpool there is cartage between the warehouse and the railway station, but at Birkenhead the railway comes to the quays; cartage would be saved at Birkenhead, and that is a very important item. When considering the improvement of the accommodation in the port of the Mersey, in respect of the cotton trade, Birkenhead ought not to be altogether overlooked. There has always been a feeling of great jealousy towards Birkenhead. I trace it originally to what I call a railway jealousy; it has arisen chiefly in that way, I think; there has always been a feeling of jealousy against Birkenhead. The leading men of Liverpool have always been the leading men in the London and North-western line, and they have great local interest in Liverpool; and there has been a little jealousy on their part as to Birkenhead on that account. I make no personal allusions, but it is a general feeling. However it may have originated, there is a bias on the minds of the Liverpool Dock Committee, that improved accommodation must be afforded through Liverpool without any consideration of Birkenhead; they think they can do very well without Birkenhead.

Railway and water carriage from Birkenhead.

Jealousy of Birkenhead.

Cross-examination.

Cross-examined by Mr. Webster.

As a railway director, my feelings may have turned in that direction; I have watched the progress of this feeling for the last eight or ten years. This railway jealousy had its origin in the London and North-western Railway interest. If you ask me to speak individually or collectively of the Liverpool Dock Committee, I think highly of them as a body of men. I do not think they are subject to that influence; it is a town influence more than anything else; Birkenhead started too fast, and caused a jealousy in the first instance. If you speak to the leading men, the London and North-western men, as to Birkenhead, they shrug up their shoulders in a very significant manner, as much as to say, "We have nothing to do with Birkenhead." I would not point a finger to any person. I do not charge the Dock Committee with being, as a body, at all influenced by the London and North-western Company. At certain periods of glut we have been hard pressed for warehouse room, during the last five or six years, when we have had

North-western interests.

a large quantity of bread-stuffs as well as cotton. I think I have heard of cotton being stored at Birkenhead. I do not know of any except an experimental cargo. The Stanley Dock warehouses are very convenient for the railway stations; we have used them within the last month, and have found them quite convenient; the Lancashire and Yorkshire Company have a goods station close by them. If those warehouses should be connected with the railway, it is questionable whether that will afford every facility for cotton we could wish; it would make it a monopoly on the part of that railway to take the cotton from those warehouses; that is the nearest point of railway communication to Preston and Blackburn, Burnley, and all the Yorkshire district. That is a large consuming district, and increasingly so; the facility for conveying cotton from Birkenhead to the Yorkshire district is not comparable to the convenience from the Stanley warehouses by that railway. I never saw the line of railway on the dock quays at Liverpool used for produce of any kind, or heard of its being so; warehouses round all the docks would be a great convenience; warehouses on the Waterlooo Dock would materially assist our requirements. *W. Tilleringtom* 24 April, 1855.

By the Committee.—I think there is an indisposition on the part of the Dock Trustees connected with Liverpool, to see the natural advantages of Birkenhead brought into requisition for dock purposes, and that such feeling had its origin in a railway jealousy. I think the warehouse interest in Liverpool would be equally opposed to the extension of warehouses round the docks, per se. The sending goods direct from the ship's side can never be carried on to any great extent. In sending goods from the ship's side direct, the bulk of the goods which are imported are for sale; they are very partially forwarded direct to the interior. I think that three fourths of all that is brought into the port has to be warehoused. The system of forwarding direct will increase rather than otherwise, but not to the extent to do away with warehouse accommodation on a large scale. Jealousy of railway and warehouse interests.

It would be advantageous that the docks on both sides of the river should be under one system of management. The advantages which would arise from a combined management would infinitely outweigh any advantage which may arise from the sort of competition which now exists. I am engaged in the cotton trade; the import of last year, at Liverpool, was from 1,800,000 to 2,000,000 bales, about 16,000,000*l.* in value, or one third of the whole of the imports into Liverpool. The spinner does not, in one case in a hundred, investigate the bulk in purchasing cotton; it is of no moment to him where the cotton lies, provided the costs are not greater in one place than the other. We are prepared to take cotton, at the same cost, from either side of the river. Amalgamation of Liverpool and Birkenhead desirable. Cotton imported.

The jealousy I have spoken of is very much a local jealousy of the town,—maintaining the honour and dignity of the town of Liverpool; the interests of the port are sacrificed in some degree to that feeling. It is Jealousy of interests.

W. Titherington 24 April, 1855.

contrary to the interest of the owners of warehouses in Liverpool, to have warehouse extension round the docks. When the Albert Dock system was introduced, they were as much against warehousing as they are now; even the Dock Trustees have great difficulty in bringing them into use, and they are not in favour with many people now. We ourselves will not warehouse there if we can take the cotton to a convenient distance; the expense of conducting it by a great joint stock company of that kind is so great, that we can do it better for ourselves. The owner of a private warehouse has a natural objection that a public body, using public funds, should invest them in a private undertaking. We can avail ourselves, generally, more advantageously of private warehouses than of those of the Dock Estate. For certain kinds of goods, this part of the scheme may be a wise one. I have been speaking of cotton only, and I maintain that we, as brokers, sometimes having charge of 20,000 or 30,000 bales of cotton in Liverpool, can warehouse it ourselves, and deliver it at less expense than the Dock Trustees would do it for us; and if we can get warehouse room within a reasonable distance of the dock, we prefer taking it into our own hands to leaving it in theirs.

Private warehouses preferred.

The sole leading motive and guide of the Dock Trustees, should be that of providing ample and reasonable accommodation for the port, without reference to any interest whatever; on that principle they should look on all sides of the river as a port. Centralization is the heart and soul of the trade. I do not think they have carried out that principle in this scheme; I think they are jeopardizing the interests of our trade in extending it so much north and south. From my experience of corporate bodies and joint stock companies, I prefer a paid head to a person giving his gratuitous services. I have nothing to say against the Dock Committee; they are admirable as a body. In a large place like Liverpool, it would be generally satisfactory to have a paid head, with reference, perhaps, to an altogether impartial body. The placing upon the Dock Committee some representative from other adjacent towns, to which towns Liverpool is, in fact, the port, as the president of the Chamber of Commerce in Manchester, would be importing foreign influence, but I see no objection to it; Manchester is closely connected with Liverpool; very much the same is the case with the whole of the manufacturing districts. Several members of the Dock Committee sit every day in the week as a sub-committee. I do not think any person living at Manchester could discharge his duty properly, as a Dock Committeeman, at Liverpool.

Chairman of the Dock Estate.

There is a stipulated charge for cotton by the brokers; we charge 6d. a bale for cartage, porterage, and delivery; that is almost a stereotyped charge; but the extension has become so great, that we often pay that amount for cartage only; it is a loss to us. In former times it was a profit, but with the extension of the docks northward it has become a loss. Where cotton is put by the Dock Trustees into warehouses, the charge is 2d. per cwt. for rent. If the cotton is to remain a short time,

Charges on cotton.

it is not worth while incurring the expense of cartage; but if it is to remain for three months, the charge is so much less at our own warehouses, that we can afford to pay the cartage away and manage it cheaper ourselves. There are warehouse-keepers who let them out at so much per bale per week. We are not warehouse owners or warehouse occupiers, but we rent them at so much a week. This is only another proof that corporate bodies never manage their business so economically as private individuals; they act on a more extravagant system, and do not look to details so much as we do. *W. Titherington* 24 April, 1855.

A high level railway would facilitate business very much from place to place, if it were well managed; it would all depend upon that. If such a plan were to form part of the extension of docks, my objection to the extension of the docks north and south would be, to a certain extent, obviated. Great stress is laid upon the Lancashire and Yorkshire station coming near to the Stanley Docks. Within the last month we have experienced this inconvenience; the railways have been so glutted, that they have closed their doors upon us at nine or ten o'clock in the forenoon, and we have had our carts waiting for six, or ten, or twelve hours, to unload. If you connect a station like that with such a string of warehouses, the probability is that it may be one half its time unable to do the business required of it. High level railway.

John Mc Nicholl, examined by Mr. Calvert. *J. Mc Nicholl*, 24 April, 1855.

I am an engineer, and proprietor of a large saw-mill near the Brunswick Dock. If the plan now proposed for the removal of the timber trade to the north be carried, I think that timber merchants and saw-mill proprietors and other parties will suffer very materially; the loss would be in proportion to the plant which they have; all the ship-builders are at the south end, without exception. If the timber trade is removed, the shipping yards must be removed also; that would be necessary in so bulky an article as timber; it would not do for them to go five miles to select timber, and cart it back to the south. I know the feeling of the timber trade; the majority are decidedly against it; they consider that ample accommodation may be found for the increase of the trade at a comparatively slight cost, without going to the north. In the year 1850 there was a timber inquiry set on foot by the whole of the trade, including every portion of it. The result of the inquiry was, that the trade strictly urged upon the Dock Committee not to extend any accommodation northward, there being ample accommodation for them at the south end of the town, and any little increased accommodation they might require for the increase of the trade might be furnished at a slight expense in their present locality. The south end is a sheltered situation; that is very important. The great bulk of the timber now comes to this country sawn into deals; if those deals are exposed in the situation they would be at the entrance of the river, it very much injures them; they come out of the ship perfectly wet; they are full of sap, and Loss on removal of timber, and ship-building from the south. Advantages of south end.

J. Mc Nicholl, 24 April, 1855.

if they are placed in that exposed situation they will deteriorate by the sudden contraction which the winds and exposure would produce; there are some deals which have been lying at the north end of the town which have suffered very much, though they are not so far exposed as it is proposed to place them now. The more easy docking of ships at the south is very important to the timber trade; also the more easy communication with the interior of the country. I believe sixty per cent. of the timber is shipped up the country south; it enters at the Brunswick Dock, and is sent in floats up the river. If it went to the north end it must pass through the whole of the crowded traffic of the river in those unwieldly floats which cannot be stopped, whatever obstacle may be in their way, without taking a very long turn.

Capital invested at the south.

It has always been found to be very difficult to move a market which has existed a long time. An immense deal of capital has been invested to meet the requirements of the trade. I estimate in land alone, occupied by the timber trade, there are 200,000 square yards, valued at 2*l.* a square yard; that would give 400,000*l.* Then there is the heavy and costly plant of the ship-builders and the saw-mill proprietors, which could not be estimated at less than 200,000*l.* That land would be completely thrown out of immediate play; it would have to pass through a transition state. In the course of years it might get better; but it would be transferring land of little or no value in one particular district instead of land of very great value, and diminishing the latter in the same proportion. Another feature of it would be the enormous mass of inhabitants which must be removed. There are upwards of 4000 men employed in the various branches of the timber trade, the ship-building trade, and discharging and loading vessels in connexion with those trades; that would represent a population of between 20,000 and 25,000 inhabitants, who would have to be moved five or six miles; and then the house property, and the persons who wait upon and administer to a trade of that kind, would suffer in the same proportion. Toxteth Park has upwards of 50,000 inhabitants, and if that trade were removed, I do not know what would become of the other 25,000.

There are disadvantages in the present arrangement of the south docks; there is not sufficient water space. The Brunswick gates are too narrow. I would, to increase the water space, either increase the size of the Brunswick Dock, so as to accommodate all of the timber in one large dock, or build another dock at the extreme of the land. I think the timber trade inquiry suggested the purchase of the Herculaneum Dock, immediately adjoining the Harrington property. Supposing it necessary to remove the timber trade, I think it should go to Birkenhead; it is more sheltered; ships are more easily docked there; the traffic up the river is less impeded; and there is accommodation for larger ships.

There is an objection to storing timber in salt water. In the first place, it cannot be exhibited to the consumers; it is now piled up on dry

land, and the consumers can examine the ends and the defects. Salt water smooths all those defects; the cracks and fissures are swollen by the water, and the consumers cannot see the quality of the wood, and that forms a great objection; that remark particularly applies to soft woods. I believe there are certain descriptions of hard wood against which the objection does not hold. *J. Mc Nicholl, 24 April, 1855.*

I have been a member of the Town Council for two years, and have studied the position of the Dock Estate as a question of finance; I believe the expenditure of four millions of money, with the prospect they have at present as to increase of trade, will materially jeopardise the interests of the bondholders. I hold in my hand a statement of the tonnage of the port during the last sixteen years. I find that, in the sixteen years ending 1853, the tonnage of the port increased 1,930,997 tons. On examining that, we find in the first eight years ending 1845, the tonnage of the port increased 1,057,547 tons, while in the second period, ending 1853, the tonnage of the port only increased 873,450 tons; so that there was a falling off of nearly 200,000 tons in the amount of the increase during the last eight years, as compared with the preceding eight years. What makes that falling off in the rate of increase of the tonnage of the port the more remarkable is, that during that eight years there were three or four causes of stimulus to commerce of the most remarkable kind; and I conclude, in the absence of those causes, the rate of increase would most materially have diminished. In the first place, the eight years happen to be coincident with free trade from 1846 to 1853; the discovery of the gold mines in California and Australia occurred in that period, and the repeal of the Navigation Laws. I believe that, in the absence of these extraordinary causes of stimulus, a most important falling off would have taken place in the trade of the port. I attribute it to this cause, that whereas some years ago Liverpool had a virtual monopoly of the whole of Lancashire and Yorkshire, and a good many of the manufacturing districts, in consequence of the great expense of internal communication, the more complete extension of the railway system deprives it of that monopoly; and now business, which used to come to Liverpool, is extended to the other ports, and that accounts for the diminution. If the tonnage of the next eight years falls as much below the tonnage of the eight years ending 1853, as the latter fell off from the former quantity, the total increase in the next eight years will be 689,353 tons. The merchants of Liverpool complain very much of the system of extension, as contradistinguished from that of concentration; it is experienced in every branch of business, and there is a strong desire, by employing mechanical contrivances, such as a high-level railway, improved cranes, improved sheds, and so on, to concentrate the largest amount of tonnage in the smallest amount of space. With the high-level railway, improved sheds, and a fresh system of cranes, they could accommodate with comfort and ease more than they accommodated last year, when I believe, in some instances, though with difficulty, they accommodated

Effect of increase of bond debt.

Rate of increase of trade.

Opinion of merchants.

J. Mc Nicholl, 24 April, 1855.

24,250 tons per acre; but that was with some degree of pressure and inconvenience. I believe they could accommodate, with perfect ease, a somewhat larger quantity than that, with suitable contrivances and appliances.

I have considered the effect of this scheme in a financial point of view; assuming that 4,000,000*l.* is expended, the increased annual charge for interest will be 190,000*l.*, taking it at 4¾ per cent., which is the amount the Dock Committee are now paying. The working expenses on 140 acres, I put down at 43,000*l.*, which is only half the amount the 140 acres now cost. I suppose there are many fixed charges which will not be increased by the extension of the docks, and therefore I have put down the cost of management and repairs at half the present price; the increase upon the annual payments will be 233,000*l.* In 1861, presuming the present rate of increase to continue, that is, presuming that none of the new trade will go to Birkenhead, or elsewhere, those rates, calculated at the present charges, would produce 46,000*l.* If a million of money be spent on warehouses, such an enormous addition to the warehouse room of Liverpool will lessen the rates. It has been already stated that people prefer, on some grounds, private warehouses, and it is quite clear that private warehouse owners will compete with those public warehouses, and get two or one per cent., rather than have nothing. I do not estimate, therefore, that they can produce more than 50,000*l.*, even though they have the advantage of having the land for nothing. They may get 15,000*l.* per annum for the rent of the land; that is in addition to any rent which they are actually getting at this moment. They are now getting, from various sources, a certain amount. I am supposing that that source of income will be increased by 15,000*l.* In 1853, there was a surplus of 15,000*l.*; but as that was somewhat less than the surplus of the two preceding years, I take the average of 1851, 1852, and 1853, making a surplus of 16,718*l.* In the year 1861 there will be an increased revenue of 127,718*l.*, which, subtracted from 233,000*l.*, would leave a deficit upon the additional expense of 105,282*l.* The timber trade have over and over again represented their opinions as adverse to a change to the north. I believe some of the members of the trade have come to the conclusion that it is of no use remonstrating any longer; that the Dock Committee have made up their minds, and that it is hopeless. Others, such as shipowners, have found a difficulty in the present dock gates not being large enough, and an alteration is required; and those timber merchants who are largely engaged in shipping, and feel the difficulty of docking their large ships, are reconciled to anything which would give their ships more easy entrance. From one cause or other, they have become tired of agitating the matter; but I am quite prepared to state that the majority of the trade are of opinion that it can be accommodated permanently at the south end. We do not state that we are sufficiently accommodated there. We require the dock gates to be widened, and we require some additional acreage for storage.

Estimated revenue in 1861.

Feeling against extension.

Over and over again the Chamber of Commerce, the only body which represents commercially the port of Liverpool, has expressed their opinion repeatedly in favour of concentration, rather than of great extension. *J. Mc Nicholl*, 24 April, 1855.

The ratepayers do not fairly and fully represent the commerce of Liverpool. I should not wish it to be exclusively in the hands of the shipowners. The shipowner has but one object, and that is to discharge his vessel rapidly and get her to sea again. He would rather, at least it is his interest, that there should be an enormous amount of dock accommodation; that if an easterly wind prevailed for six weeks, and hundreds of vessels accumulated in the channel, they should run up the river and find dock accommodation immediately; and if it were left entirely to the shipowner, he would disregard the financial position of the Dock Estate and the dock bond holders. The infusion of the nominees of the Town Council is advantageous in the Dock Committee; being trustees and a corporate body, they would naturally look at the financial position of the Dock Estate; and the discussions have turned in the Town Council, generally speaking, not so much upon any management of the docks, as upon money matters, and connected principally with the security of the estate. That arrangement has been found to work well. I think it would be desirable to have a paid chairman of the Dock Trust, appointed by the Board of Trade; I think it would not be distasteful to the merchants of Liverpool. I would not recommend, as I have heard suggested, that Liverpool persons should be excluded from the appointment; I think the Board of Trade should be unfettered in their choice of a suitable man; he should be a sort of representative of all the interests affected by the Dock Trust. I think the same class of merchants would serve on the Dock Committee, under a paid chairman, as now under a honorary chairman. The timber trade is increasing, but the increase has taken place almost exclusively in sawn timber; and the concentration is so desirable, that people are beginning to pile the timber higher and higher every year, not to save rent, though that is an additional advantage, but in order that their stock may be comprised in a less space. There would be difficulty in obtaining much deeper water at the entrance of the Brunswick Dock, owing to the bank. I do not think they would get much deeper water there. If you are to increase the dock accommodation you must look further south. My own opinion is, that Birkenhead, with the present amount of dock accommodation, will supply all the wants at Liverpool for the present century. If the north end scheme and the Birkenhead scheme go on at the same time, those two enormous properties contending for the same annual increase in the trade, I can see nothing but ruin to the two estates. It may be still prudent for the Dock Estate at Liverpool to secure the land which they may hereafter want, and if they want, may have to pay a most excessive price for hereafter. When this subject was brought before the Town Council, I opposed the borrowing powers for this large amount; but as far as the

Different interests to be represented.

The addition of Birkenhead sufficient for the present.

J. Mc Nicholl, 24 April, 1855.

purchase of Lord Derby's land was concerned, I thought it a wise and a prudent measure, and I think so still. They are under some obligation to Lord Derby to build some docks there in a given time, and to get rid of that obligation, I think they should make some arrangement with him; because it would be cheaper to do that, and less burdensome to the estate to get rid of our obligation, than to make an enormous outlay which would fetter the interests of the estate permanently. I do not see how the rent can be proportionably lower at the north than at the south. The Wapping Dock, for example, has cost an enormous sum of money; they have had to pull down warehouses and buildings, and have made a very small amount of dock accommodation. That dock is charged precisely the same rate as the other docks; they equalize the estate. It should be so with the land; it is a question what the purchasers can afford to give for it. I have been a member of the corporation, and I consider the proposed scheme a very unwise one as regards the interests of the port.

Hilton Halhead, examined by Mr. Goldsmid.

Hilton Halhead, 24 April, 1855.

I am a timber merchant at Liverpool, and have been in that trade nearly thirty-two years. I am a member of the Town Council for North Toxteth ward, which is immediately below Brunswick Dock. I have been returned to the Council almost entirely because I am opposed to the removal of the timber trade from the south end; there are three representatives for the North, and three for the South Toxteth wards, besides one alderman to each; and I believe it would be impossible for any one to represent any of those wards who was in favour of the removal of the timber trade to the north end of the town. The inhabitants of those wards are so much against the removal of the timber trade, that they would elect no man who did not agree in that opinion. It has been intimated by Mr. Gregson that as many as 10,000 people might be possibly removed; and they think they have not been fairly dealt with, that more active measures have not been taken at the south end, the Harrington Estate having been purchased many years ago, entirely to give accommodation to the timber trade. My firm has some timber sheds and offices. I have always been of opinion that the south end is best adapted for the timber trade, and have seen no reason to change it. That was the opinion given by Mr. Bramley Moore, and the deputy chairman, and the dock surveyor of the Dock Trustees, in the year 1844, and was the reason they got liberty to purchase the Harrington Estate, and they then stated that the timber trade could only be carried on at the south end of the town. I heard Mr. Mc Nicholl's evidence, and concur in the reasons he gave against the removal of the trade to a large extent. I think vested rights ought not to be trifled with; sheds and offices have been erected, and all the premises at very great expense, after many years' experience as to the best method for carrying on

Opposition to remove from the south.

that trade; and I think those interests should not be lightly dealt with. The inconvenience that would be caused by floats going up the river from the north end to Runcorn is, I believe, almost insurmountable; that was one of the greatest difficulties which Mr. B. Moore, the late chairman, had in proposing the north end scheme, seeing the difficulty of the traffic continually passing the ferries with those long floats, which I dare say the Committee are aware, are towed up by a steamer, with as many as eight or ten, or even more than that behind it; they cannot control them. Three-fifths of the whole of the quantity of timber imported into Liverpool, and four-fifths of what is sent out of Liverpool, goes up the river. At the south end the docks are in a more sheltered position than at the north. As timber merchants cannot sell their timber by sample, as other produce can be sold, to go to any exposed place like the north will be very inconvenient; we have to go to our different yards to show the timber, we cannot sell it by sample. The south end is much nearer the centre of business; we have continually to send clerks to the Post-office, the Custom-house, the Excise-office, and other offices; I have to go to the Exchange myself every day, and instead of going a mile, we must go two or three from the north end of the town. From the Custom-house and the Post-office, to the nearest point of the Huskisson Dock, is two miles; to the end of the timber dock will be exactly a mile; so that the further end is three miles. The Herculaneum Dock, if purchased, would have enabled the Dock Committee to supply all the wants of the timber trade, and it has been very often pressed upon the Dock Committee to do so. That would have been a more economical plan of accommodating the timber trade than is now proposed. The timber trade has never occupied more than about one-third of the Harrington Estate, which consists of 140,000 yards to the west of Sefton-street, and 37,000 yards in a complete hollow, which has never been occupied at all with timber since it was purchased. Those 37,000 yards are land, with a muddy bottom, and filled partly with water; it has been left as it was when the estate was originally purchased from the Earl of Sefton. It was recommended, at the termination of the timber trade inquiry, that the Toxteth Dock should be enlarged to three or four times its present size, and with the excavations from that dock that this hollow should be filled up; it would have produced a revenue, and I believe could have been done for 54,000*l.*, according to Mr. Hartley's estimate at the time; that would have supplied all the wants of the shipowners at that time, and have made 40,000 yards of land available. The timber trade has the use of the Herculaneum Estate to about one-fourth its extent. The Herculaneum Estate is very much like the Harrington Estate; there is a large open bay; nearly half the estate is in this bay, and more than half if you take into account the ship-building yards. The north end scheme proposes to give the trade about 120 acres in addition. We have never required more than about 15. I consider that the 120 acres is a most extravagant and excessive amount of accommodation, and a

Hilton Halhead, 24 April, 1855.

Additional accommodation at the south.

Hilton Halhead, 24 April, 1855.

most unnecessary expense. The Brunswick Dock has been hitherto applied to discharging timber; more work can be done than has hitherto been done; it was tried in 1850, and it was found that in five or six weeks, shipping to the amount of 52,000 tons was discharged, which represented about one-fifth of the entire for the whole year, and that without any comparative inconvenience. We have a much better system for discharging timber than we had; I believe it was introduced at the suggestion of the present chairman; a limited space opposite each ship is allotted to the discharge of her cargo, and that has made a very great alteration. The previous practice was that each ship discharged its timber, and put it wherever it could; there was no plan or rule; might seemed to be right. By means of this much better state of things, we can discharge our timber with greater facility, and give despatch to ships, and everything which is desirable in that way.

Large increase of bond debt injudicious.

I concur with the witnesses who have stated that an outlay of 4,000,000*l.*, in addition to the 6,000,000*l.* now existing, will endanger the existing bondholders; I think it most unwise and injudicious. The debt of between five and six millions has taken more than a century to grow up. If the Dock Committee insist upon going on with anything like the expenditure of 4,000,000*l.*, it will alarm the bondholders, and they will not get money at the same rate of interest they have done hitherto. If you add simply a half per cent. (the average rate of interest now being four) upon five or six millions, you at once create an additional interest, payable in the shape of interest upon bonds, of 25,000*l.* to 30,000*l.* Taking the average of the last ten years, the dock revenue has increased at the rate of about seven to eight thousand pounds. The last year there is a very large increase; but if you go back several years, we have invariably found, after a very excessive year, for one or two years succeeding it has been very much diminished. That average increase of between seven or eight thousand a year, would only allow annually, an

Extent of annual outlay.

outlay of about 160,000*l.* per annum, without deducting the working expenses; these would not be in the proportion they are now, because the same secretary and surveyor would do then as now; but that would reduce it, perhaps, to 40,000*l.*, leaving an expenditure of about 120,000*l.* per annum. When the north dock scheme was first proposed, Mr. Bramley Moore stated it as his opinion that land could be given to the timber trade at threepence to fourpence per yard; that was the great reason why many of the timber merchants did not oppose it; the rent has been gradually getting up; the last figure I heard was 10d. to 1s. The proposed removal of the timber trade will not cheapen the average cost of transit into the interior; the river traffic, which is the bulk of it, will be greatly increased in cost, inasmuch as they will have to travel over four miles further of ground, and very often lose one tide. If the removal of the steamers from the Union and Coburg to the north docks, would enable the Dock Committee to give still further accommodation to the timber trade, the timber trade also recommended, in sum-

ming up their inquiry, that the Coburg and the Union Docks should be thrown into one. A part of the scheme was that Mr. Hartley's yard, which is now at the west side of the Brunswick Dock, should be given for the use of the timber trade, and Mr. Hartley should remove his yard. That recommendation was in 1849 and 1850. I do not think that the timber trade have changed their opinion much since 1850; many of them have been led away by the repeated promise of cheap accommodation and long leases, and they are content now to remain passive till they see what offers can be made to them from the Dock Committee; they will then state whether they will remove or not. It is possible for the Dock Committee to compel the trade to go; if they carry out their scheme of the Brunswick Dock, and build warehouses there, we shall have no discharging ground, but I believe the bulk of the trade are for remaining passive till they see what offers are made to them. They will be content to pay more than 3d. or 4d. a yard. Canals and railways near to them are promised, and it would depend entirely upon what accommodation they offer; they may build sheds and offices, or put tramways in the yard; we know nothing of that; all they speak of is to make a canal through the ground, but how they will leave it we do not know. I was present at the meeting at Mr. Steele's, which Mr. J. Holme spoke to. If I recollect it was in this way: Mr. Steele or Mr. Smith, who are both members of our trade as well as of the Dock Committee, came from the Dock Committee, and stated that Mr. Holme was coming down with a model of the north docks on the following day, and that he would be very glad to explain it to us and take our views upon the subject, and as many as heard of that, I believe, attended; there were, I should think, from twelve to fifteen. Mr. Holme made great promises of what they could do for the trade, but there was a very strong opposition to many of the details; one wanted this, and another wanted the other. I did hear that Mr. Holme expected the meeting would be unanimous—that he came prepared with a resolution ready, thinking to get the unanimous feeling of the trade to that scheme, but, so strong was the opposition, that he never produced it; I am not sure that he had it, but I heard so; he did not propose any resolution. As to letting the ground at low rates and long terms, they promised great things every time they had an interview with the timber trade. We have not found that they ever bound themselves to do those great things. They have raised our rates at the south end of the town, and made a very marked distinction between that and the north end; they are charging at the Huskisson one-sixteenth of a penny, and at the west side of the Brunswick eight-sixteenths of a penny, for land which is about equally valuable at each place; they have been trying to thwart us in every way they could; they have been taking away our land, for the purpose, I am afraid, of driving us to the north end. The rates at the north end and at the south end are very much out of proportion to the comparative value of the land. Mr. Holme calculates the land there at 17s. 6d., everything completed; the interest

Hilton Halhead, 24 April, 1855.

Timber trade are passive.

Meeting on plan in 1854.

Increase of rates at the south.

Hilton Halhead, 24 April, 1855.

of that would be very nearly a farthing, or four-sixteenths; they are charging one-sixteenth, and they charge eight-sixteenths at the south end of the town; I think it is to encourage the north, and to make us discontented with our position at the south. The timber trade is what they call a large lumbering trade; it requires great space, not only for the discharge of ships, but for the deposit of timber, and it must be at one extreme end of the town; and if they could only get rid of us at the Brunswick Dock, it would make a very nice dock for general merchandise. I think the motive is a good one on the part of the Dock Committee; I do not quarrel with it so far as we are concerned, but we think we have no right to be made a convenience of for the general benefit of the port; we pay one-sixth or one-seventh of the revenue of the Dock Estate, and we think we ought to be accommodated. I am not fond of Birkenhead; I say it candidly; it would depend entirely upon the accommodation offered by the two parties. The land at the north would all be in the hands of the Dock Committee; that would be a decided disadvantage. I have seen enough of the Dock Committee, as a fluctuating body, to know this, that we have no binding rule upon which they would act; they cannot bind their successors.

Disproportionate rates at south and north.

Disadvantage of monopoly of the land.

Wednesday, 25th April, 1855.

THE RIGHT HONOURABLE HENRY LABOUCHERE IN THE CHAIR.

Mr. Gregory applied to the Committee, to request the proper officer to attend from the Admiralty, and produce the plans and documents which were lodged at the Admiralty in reference to the sea wall, authorised to be made under the Act of 1848.

The Chairman stated that he would communicate with the Board of Admiralty.

W. H. Anthony, 25 April, 1855.

William Hollis Anthony, examined by Mr. Hardy.

I am a timber merchant at Liverpool, and have been connected with the trade for twenty-five years in Liverpool; I am also a shipowner there. My place of business, in Liverpool, is in Sisson-street, about the centre of the Brunswick Dock. I have all the sheds and offices for carrying on trade there as a timber merchant; they are complete in themselves, and suited for my business. That part of Liverpool is a great deal better than the north end for several reasons, both for transit up and down the river, and likewise being less expensive than the north. Labour in the yards at the north is stopped at times. In 1852 I went down to purchase a cargo of deals there, and the ship was stopped on account of the weather blowing too heavily; the men could not work in

South preferable to north for timber trade.

Less exposure.

piling the deals or discharging the vessel for a day or two; it was a cargo by the Greenwich. I have always been of the same opinion as to the value of the south end for our trade. There was a timber inquiry in 1848; the evidence given upon that occasion was entirely in favour of the south end, at least the majority of it. We had the support of the chairman of the Dock Committee in the House of Commons in 1844. The proximity to all the principal offices in Liverpool is more advantageous than it would be at the north end, being much more central. I very seldom go to the north end except urgently required. The Herculaneum Dock property is to the south of me; if that were applied to the timber trade, it would give much more facility. I think the opinion of the timber trade was, that taking all the property from the south of Coburg Dock, it would give ample accommodation to the timber trade for years, if not for ever. A large portion of the Harrington Estate is, at present, unoccupied; I believe that one-fourth has not been occupied; it is not at present in a fit state to be used; it is left vacant from not being levelled; it might be filled up to make it available with the rest. There is material which might be used; there is the excavation of the Toxteth Dock, and the levelling of the property by the Herculaneum, and some high land that might be cut down to fill up part of the river.

W. H. Anthony, 25 April, 1855.

Land at south sufficient.

If the trade is to be removed, I should prefer to remove to Birkenhead; it would be better for the general purposes of the port. I look upon Birkenhead and Liverpool as being the port of the Mersey. From the extreme risk of docking ships at the north end, and also from the exposure in landing timber and storing it, I should prefer Birkenhead; it offers facilities for carrying timber up to Runcorn without interference with the traffic of the river. The capabilities of the Brunswick Dock have not been developed as they might have been; with more machinery and appliances, it might have been made much more available than it is now; there is a want of width in the gates, and other things, which might be altered. The timber trade was not consulted as a body as to the scheme of 1848. [*By the Committee.*—There are two timber merchants upon the Dock Trust: one is Mr. Steele, who has always advocated the south end; I believe he has not attended the Dock Committee from some family affliction; he has always supported the south end interest. The other gentleman is Mr. Smith, who has given his evidence here. Mr. Steele was selected by the timber trade generally; the other, I believe, was put in by the Shipowners' Association.] I was present at the meeting at Mr. Steele's, of which Mr. James Holme spoke. I met Mr. Holme on the quay, he said there was to be a meeting, and it was passed from one to another that there would be a meeting, and Mr. Holme would bring his plans to show. With the exception of that meeting at Mr. Steele's, there has not been any meeting of the timber trade in reference to the present scheme. Twelve or fifteen met at Mr. Steele's. Mr. Holme showed us a model, something conforming to that

Liverpool and Birkenhead the port of the Mersey.

Meeting of timber trade.

W. H. Anthony, 25 April, 1855.

plan, but not quite so extensive; the back land was not shown upon the model, and I suggested that he would require the back land to make it a more complete scheme, but the appliances at the south end, I said, were sufficient, if it were applied in the same way. I stated that. The meeting was quite divided as to the scheme; there was no resolution come to, or proposed, one way or the other. No meeting was subsequently called of the body of timber merchants to discuss the question. At this moment there is a difference of opinion prevailing among them; most of them are in favour of remaining where they are. We have always been moved about by the Dock Committee previously, as suited them; and, therefore, without an act to grant us leases, we should be, I think, in the same position as hitherto. All the members of the North and South Toxteth Wards are nominated, in a great measure, by the promoters of the south end scheme. It is a question which is generally put to them, to know whether they will support the timber trade remaining at the south. We rely upon those parties for protecting our interests without coming to Parliament to petition; few of us like to go to the expense of coming to Parliament.

No general meeting of timber trade.

Cross-examination.

Cross-examined by Mr. Merewether.

Every one engaged in commerce, would prefer that the dock, attributed to his particular department, should be as near as possible to his place of business; looking to the general welfare of the town, I do not think we always so wish with our own interest as to oppose the general welfare of the town. The Birkenhead question has been inquired into; in 1849 there was a sub-committee of the timber trade, which went to look at Birkenhead. It is not laid out for the timber trade at present. The result of our visit was not the rejection of Birkenhead. I have not seen Mr. Farnworth's evidence; he is more a timber broker than a timber merchant. Mr. Rankin is on the Dock Committee, and engaged in the timber trade as an importer. Mr. Challoner is on the Dock Committee; he is connected with the timber trade. Mr. Gregson is a saw-mill proprietor, in the same business as Mr. Mc Nicholl, who was examined yesterday; he is on the Dock Committee appointed by the Corporation; he is connected with the timber trade; he was sent to the Town Council by the south end people.

As to dealing with the Harrington Estate, I do not mean exactly filling it up, but laying it out for the accommodation of the trade. I would not pledge myself to any plan at present; some similar plan to the one Mr. Holme produced for the north, that is what I should wish for the south. I gave a good deal of attention to the subject at the time of the timber inquiry. The timber trade has been such an important trade, that it ought to be considered as one of the first. Those who represent the timber trade in the Dock Committee, may not have had sufficient power to have carried out their own views.

Plan for the Harrington Estate.

W. H. Anthony, 25 April, 1855.

Re-examined by Mr. Hardy.

Mr. Gregson, appointed by the Town Council and supported by the south end people, has written a pamphlet in favour of the south end; I believe he has adhered to his views, and has supported the south end against the north end in the Town Council.

T. Rimmer, 25 April, 1855.

Thomas Rimmer, examined by Mr. Goldsmid.

I am the manager of the Harrington Carrying Company; we carry more timber than any other firm in Liverpool; we carry timber both from Liverpool and from Birkenhead to Manchester, and to the neighbourhood, by boat, by way of the Duke of Bridgewater's Canal. Our wharf is situated at the extreme south end of the Harrington ground. We carry from all parts of the docks, including the Huskisson Dock; the bulk of our business is done from our own wharf, at the south end of the town. About 60 per cent. of the whole import of timber into Liverpool goes up the river. Mr. Rankin's objection to the south end is this, that a part of the ground is up hill, and consequently there is a greater expense of cartage. Mr. Rankin does not give the figures in any of his evidence; the figures are these. The charge for cartage from the Brunswick Dock to the Harrington ground, is 17s. a thousand cubic feet. This place up hill is 1s. a thousand feet more, which I apprehend to be a very small objection. The distance up hill is rather greater, and the 1s. a thousand feet, I apprehend, is laid on on account of the distance, rather than its being up hill. The objection to piling timber high is solely the expense; it is all done by manual labour; but there are many advantages in piling it high; it preserves it from the weather, and the timber is more at hand; the expense could be easily got over. I do it now by manual labour, and it costs 14s. a thousand feet; that is all done by manual labour; but in Manchester I pile it by machinery, and it costs me 3s. 6d. a thousand cubic feet. If I put steam power to my cranes I could do it for less than that. By the advantage of machinery the expense of piling would be almost abolished; it could be done at one-tenth of the present expense. I am acquainted with what was proposed by the Timber Inquiry Committee in 1850. Their proposals were final, but those proposals have not been carried into effect at all; if they had the trade would have been satisfied—it would have been adopting their own report, in fact. I speak of the bulk of the timber trade, of course, not all of them. The charge is uniform for tugging ships into all the docks in Liverpool; if there is any difference, it is on account of the distance sometimes. If a ship is taken from the anchorage in the Sloyne to the Huskisson Dock, a little extra charge is made. From the Sloyne is rather dearer into the Huskisson Dock than into the Brunswick, except in particular cases. They charge more for very large ships into the Brunswick, on account of the gates being narrow; the widening the gates would get rid of that extra charge to a great extent.

Objections to south for timber.

Uniform charge for tugs for docking.

T. Rimmer, 25 April, 1855.

The largest saw mills I ever saw are at the south end; I think they are the largest in England. The advantage of the railway accommodation at the north end is doubtful for timber. I think 60 per cent. of the entire import is carried by water; the railway carries 20 per cent.; that is quite as much as the railway can manage. It frequently happens that the railway company closes its wharf, and refuses to receive more timber for several days. I should say that the wharves for the railways include more space than all the water-carrying companies altogether; yet they are embarrassed with their comparatively small traffic. Timber is not a sort of traffic desirable for a railway, but it can be carried from the south end as well as at the north. There would be no advantage from the flats getting out an hour earlier on the tide from the north than from the south; it would be a great inconvenience to us to have to go to the north end of the town. We carry our timber from Liverpool up to Runcorn, a distance of twenty miles—we leave Runcorn at high water, and come down with the ebb tide to Liverpool, load our boats, and go up to Runcorn the following tide. We have just twelve hours to leave Runcorn, load our boats, and get back again; but if we had to pass the whole front of the docks, an additional distance of five miles, we should not have time to load our boats till the following tide, and we should be twice as long doing our business. What we now do in one tide, we could not do in less than two tides. A timber float is as easily managed as a ship; but a train of floats is very difficult to handle. I have seen trains of floats containing twenty-four attached to a single steamboat, the length of the train was nearly 1100 feet; those all go with the tide. It is impossible to stop that train; you may stop the steamboat, but you cannot stop the floats; the floats are carried on by the tide and get into confusion. Therefore, if we have to pass the front of the town where all the ships are at anchor, and to cross the tracks of the ferry-boats, and to cross the entrances to all the docks, it will be a very serious inconvenience indeed. On stopping the steamer the floats go on, not for a certain time only, but they go on absolutely; they are going with the tide, which sometimes runs with great rapidity; we have had experience of that. Mr. Rankin says if you take the timber trade to the Huskisson Dock, you will relieve the river of a great deal of traffic, because you will not have to take large ships past the town, and take them into the Brunswick Dock. The contrary is the case. We once carried a quantity of timber from the Huskisson Dock; we had about forty boat-loads, and instead of having one ship taken past the town, we had forty flats to take up and down past the town before we got the cargo carried up, which greatly increased the traffic upon the river. If the ship had gone into the Brunswick Dock, we should only have had one ship instead of those forty flats; as it was, we had to take the cargo in detail past the town, and then to come back with our empty boats past the town again. In foggy or windy weather we are obliged to stop our traffic; we do not work from the north end of the town under such cir-

Railway not suited for timber.

Disadvantage of north end for the flats.

Train of timber floats.

Great increase of traffic from timber at north end.

cumstances; we could not with safety. We can work the trade from the south end frequently, when we cannot work it from the north end. In the course of this month I sent some boats to the Huskisson Dock to bring out some timber. I sent them in on Saturday, and loaded on Monday; it was blowing so hard that the boats could not get out; they had to remain there till Wednesday. In the mean time my trade from the south end of the town was quite uninterrupted, and that has occurred to us a dozen times and more. The risk of moving the floats in windy weather, arises partly from the danger of collision with the ferry steamers; but even if the river was quite clear, we could not bring our boats from the Huskisson Dock in windy weather. The trade would be stopped altogether, and often is stopped. I have had boats there a week sometimes, and have been unable to get them out. This objection which I speak to—about the windy weather, would be greatly increased if we go up a mile and a half further north still; we are then open to the whole roll of the sea, and our boats would fill if we ventured to take them out. There is an objection to the storage of fir timber in water by all consumers; supposing you store timber in water for the sake of economy, we must charge you a higher freight; it is increased in weight ten or fifteen per cent., and what you gain by storage you lose in the way of freight. The increase in weight is to the extent of ten or fifteen per cent. The timber trade would be seriously injured by its removal to the north, especially as regards the facilities of moving timber up the country by water. The busiest months in the year for timber carriage are August, September, and November, which is a very stormy season in the Mersey, and at that time of the year the river is generally most crowded; it would be a very difficult thing to move floats past the crowded river in those months. We have had boats detained a week in the Huskisson Dock; that is, the first detention on getting there, and then getting back; I have had the boats lose a week in consequence of having to go to that dock; it takes an additional week. During that time, our traffic was uninterrupted from the south end, because the south end is so sheltered; but the north end is so exposed, I had a boat detained three days during the present month. The result would be that the timber trade would be put to loss by this delay and inconvenience; very often we have to carry some 300 tons a day, and if we lose three or four days the accumulation of timber would be frightful. The railways would not help us at all. I know it to be Mr. Braithwaite Poole's opinion, that timber is not a desirable traffic for a railway; he is manager of the London and North-Western Railway. The accommodation for loading timber at the south end, by railway, is at least equal to the accommodation of all the water-carriers put together; I mean the station accommodation at the wharf; with that large station accommodation, it cannot do one fourth of the business the water-carriers do. Canals are preferred to railways for timber, which is a very bulky article, and pays a low freight, and the railways can gene-

T. Rimmer, 25 April, 1855.

Interruption of trade from the north.

Wet storage.

Detention of flats in Huskisson Dock.

T. Rimmer, 25 April, 1855.

rally be employed better than by carrying timber. I would rather carry from the south end of the town at ten per cent. less money than I would take from the north end of the town; it would not be a question of price. I would not carry timber from the north end of the town; the question of freight would not induce me to do it—we could not do so with half the facility or safety that we can from the south. If I had to choose between the north end and Birkenhead, I should prefer Birkenhead to carry timber from; it is always easy for our flats to get in and out of Birkenhead. I should prefer the south end to Birkenhead. We have a good deal of experience of Birkenhead and the Huskisson Dock and the south end; I prefer the south end because we get a clearer start to go up the river; we start now clear of all the traffic in the river altogether. Of the timber imported, a good deal is sent from Liverpool to Birkenhead, about 10,000 tons a year, for transmission to Birmingham. Some ship-building yards are being erected at Woodside, which, when completed, will consume a large amount of timber, and be more easily supplied from Birkenhead than from the north end, or even perhaps from the south end. The last November and December were two very stormy months, and there were very few days when we could have carried timber from the Huskisson Dock up to Runcorn. We were detained several days during that time, even from the south end, but the delays were only occasional and short. We lost half a dozen days from the south end, and I do not think we could have carried it on half a dozen days from the north. I have conversed with other timber carriers on this subject, and they are all unanimous. They all hold the same opinions I have stated to-day. I never heard of the meeting at Mr. Steele's till lately; none of the carriers were consulted about that meeting.

Cheaper rate of carriage from the south.

South end preferable to Birkenhead.

W. Slater, 25 April, 1855.

William Slater, examined by Mr. Hardy.

I am a partner in the firm of Slater, Holme, and Cooke, carrying on business, both at Birkenhead and Liverpool, as timber measurers and brokers. We are very largely concerned in the Honduras and mahogany trade; we sell three-fourths of the Honduras mahogany which comes into the Mersey. We receive it all in Birkenhead; it comes direct into Birkenhead. I cannot understand where Mr. Turner could get his information, that mahogany lying at Birkenhead lost ten per cent. value, as compared with mahogany lying at Liverpool, seeing that five importers out of six, who are in England, choose to send their mahogany to Birkenhead; if such had been the case, they would not have sent it there for the last six years. I have a statement in my hand of the number of feet imported into Birkenhead, contrasted with the number of feet imported into Liverpool during the same time. The return embraces a period of six years; into Birkenhead there have been brought 9,420,824 feet; into Liverpool 2,230,680. The importers find it more profitable to bring that Honduras mahogany to Birkenhead than to Liverpool. The dock dues on mahogany are not charged 1s. a ton, which is charged

Mahogany of higher value at Birkenhead than at Liverpool.

in Liverpool; the charges at Birkenhead on mahogany are considerably less than in Liverpool for piling, storage, and delivery. The Dock Company do the whole of that; in Liverpool, private individuals do it. I know the opinion of buyers of mahogany to be favourable to the way in which the business is transacted at Birkenhead. The price paid by the buyer there includes the expense of loading on the railway carriages, which are brought alongside and under the sheds. In Liverpool, after the wood is purchased, there is the addition of a heavy expense for porterage and cartage. Within the last year or two, since we commenced business in Birkenhead, the railway has been placed into the brokers' sheds; it was not so before; and now, all goods going by railway are loaded at the railway company's expense, but if it has to be carted to the water-carriers the expense falls upon the buyer. When not so loaded, it suffered from being dragged through the mud, and was torn by the timber dogs. *W. Slater*, 25 April, 1855.

Cross-examined by Mr. Merewether. *Cross-examination.*

The arrangement for mahogany in Birkenhead is the best in England. The bill does not interfere with my mahogany business, I believe. I do not know that the mahogany trade have applied for accommodation at Liverpool. Our firm wrote a letter to Mr. Carmichael, requesting to know what the Liverpool Dock Committee would give us a certain accommodation for at the Huskisson Dock; and that was because Mr. Carmichael was dissatisfied with something which had been said to him at Birkenhead; and it was to hold in terror over the Birkenhead people, to keep them from raising their charges.

Re-examined by Mr. Goldsmid.

Birkenhead has done a very great deal of good to Liverpool by competition. Mr. Carmichael was trying, by the competition of Liverpool, to keep the charges at Birkenhead as they are.

Charles Turner, further examined by the Committee. *C. Turner*, 25 April, 1855.

By the Act of Parliament by which the Birkenhead Docks, and all vessels not using the Liverpool Docks, were relieved from these dock rates, dues were established for the purpose of keeping up the buoys and lights, which all vessels are interested in on whichever side of the river they go. Those are sometimes called harbour dues; in fact, they are dues for the purpose of keeping up the buoys and lights. The schedule of those charges is to be found in the Act of Parliament. There is a regular account kept of the buoyage and lightage paid by all vessels not using the Liverpool Docks, but it does not appear to have been kept regularly for those which do use them; that is included in the general charge. The Act of Parliament directs that those rates shall be revised every three years, for the purpose of their not being more than sufficient, according to the probable estimate, for the maintenance of the buoys *Harbour dues.*

C. Turner, 25 April, 1855.

Surplus to Dock Estate.

and lights. If there is any surplus, no doubt it goes to the general dock fund. As regards vessels not using the Liverpool Docks, there is a strict account kept; as regards those vessels which use them, when we make out the account for this revision, we take the tonnage and calculate what it will be, supposing those rates were regularly charged and carried to a separate fund. Taking those two together we ascertain exactly how much has been raised under this particular clause. We have the means of coming at it in the way of estimate; in that way I should think that estimate may be relied on. I have no doubt the funds have more than covered the expenses to a certain extent. As it affects vessels not using the docks the matter is very trifling indeed; the extra charge levied upon them is so trifling that it amounts to nothing almost; I can bring to you a statement of it. As regards the vessels using the Liverpool Docks, the rates are so much below what we have the power of charging, that it does not affect the question. I mean to say it is treated there as a whole, and we charge considerably less for dock dues and buoyage and lights than we might charge for dock dues alone. The amount is included in the general dock rate as regards vessels using the Liverpool Docks. As regards vessels not using the Liverpool Docks, we are obliged to keep a specific account and make a specific charge. The manner in which this particular rate is levied on vessels not using the docks, does not operate as a fine upon the vessels for not using the docks in the slightest degree. The proper principle would be to charge rates sufficient to cover the expense under that particular head, and not to make them a source of revenue to the Liverpool Dock Estate. If we kept the matter strictly, there is no question we ought to charge as regards the Liverpool Docks, one rate for entering the docks, and one for lighting and buoyage; but as the rate has been so much below the maximum, it has not been thought desirable to keep a separate account. I do not know that there would be any practical inconvenience in levying these rates strictly. Those rates were revised last year by myself, the mayor of Liverpool, and the senior magistrate of Cheshire. The average of the profit may have been two or three thousand pounds a year. I do not think the average levied upon vessels not using the Liverpool Docks would be fifty pounds per year; that is because there would be very few vessels. If there were many vessels using other docks, the share of the two thousand a year might be considerable. We have the items in our accounts showing the cost of the buoys and the lights. I can give the Committee an exact account of the expenditure upon the lights and buoys, and an exact account of the receipts from those lightage and buoyage dues as regards vessels not using the Liverpool Docks, and calculated according to the same rate upon vessels using the docks. We have a marine surveyor who manages the lights and buoys under the trust. His charts, I believe, are admired by every foreign commissioner. We have had several foreign commissioners over, and they have been highly complimentary to Lieutenant Lord. I

Rates for dock and harbour purposes should be distinct.

Marine surveyor.

believe the system of lighting and buoying is admitted to be one of the best in the world. The Americans, I think, wrote a letter highly complimentary to the system, and recommended it as the best system which they had seen. If that was put upon the conservancy, it would relieve the dock trust of a very heavy charge which it pays. *C. Turner*, 25 April, 1855.

James Meadows Rendel, examined by Mr. Calvert. *J. M. Rendel*, 25 April, 1855.

I am engineer in chief to the Birkenhead Dock Trust. In the early part of 1843, I was applied to by some parties connected with the Cheshire shore of the Mersey to consider the possibility of establishing docks in Wallasey Pool; and in the course of the summer of 1843, I examined very minutely indeed the site which had been so proposed, and afterwards made a careful examination of the Liverpool Docks. I inquired with care into the nature of the trade of the Mersey, and into the accommodation afforded for it in the Liverpool Docks. I thought those docks, as I then found them, largely deficient, from the necessity of making them along the margin of the river, the town of Liverpool having restricted the breadth available for dock accommodation inland, and the Liverpool Corporation having filled up what was originally a pool not very unlike, but smaller than Wallasey Pool. That pool was filled up, and it is now built on; the Custom-house stands on a part of it. The pool is, in fact, filled up and no longer exists; the high ground rising immediately at the back of the shore limited the capacity of sites for docks to an extension along the line of the river. That, inasmuch as the pool, sheltered from all the stream and the tide, would have given great facility for dock accommodation on its margin as contrasted with what can be afforded on the stream on the line of the river, was a mistake. Also, the entrances had necessarily been made very numerous, as the consequence of having to build the docks along the margin of the river; but I also saw that those entrances were necessarily brought close out upon the river from the circumstance which I have before referred to, namely, the want of breadth upon which to make the docks inland. I observed a difficulty in laying deep sills at Liverpool, and necessarily so, from the circumstance that the tide comes up from the northward and westward. Liverpool is a lee shore on that line of exposure; the entrance to the river is surrounded with sand banks; and, as a matter of course, the stream of the tide and the waves breaking over these banks, carry away the sand along the Liverpool shore, and deposit it on the entrances made, as I before stated, necessarily so, close upon the stream of the tide. The absence of deep sills, so at to enable vessels to get in at an early time of the flood and to work out till a late time of the ebb, necessarily restricts the period of docking and undocking to about high water; if you could get deeper sills, you would have a longer time of each tide to dock and undock your vessels, and fewer entrances would be necessary to do the same business. In the inquiries of 1848, Mr. Hartley, who

Filling up of the pool at Liverpool.

Inconvenience of situation.

Period of docking restricted by want of water on sills.

Limit of depth of sills.

J. M. Rendel, 25 April, 1855.

knows, I take it for granted, all the difficulties of Liverpool as well as any man, gave it as his opinion, in fact, as the result of his experience, that they could not lay the sills even then lower than six feet below the old dock sill, which is the standard level of Liverpool; six feet being two feet eight inches above ordinary low water at spring tides, and about nine or ten feet above extraordinary low water.

Depth of sills of increasing importance.

That, having regard to the trade of the port, was a very important consideration in 1844; it is now a very much larger consideration, and it will become a very much more serious consideration still; because all commercial men must admit that the increase in the size of the shipping is more rapid than any of them contemplated, and promises to be still more rapid; and as the size of ships increases their draught increases, and, as their draught increases, the difficulties of the Liverpool shore for making convenient docks will be greater and greater necessarily. Upon careful consideration of the circumstances of the Liverpool Docks, I formed my plan for docks upon the other side of the river, endeavouring as much as possible to prevent any such consequences as I had observed upon the other side. In the first place, I considered it a positive necessity upon an engineeer charged with making docks in Wallasey Pool, to avail himself to the fullest possible extent of the natural facilities which that pool afforded for avoiding the inconveniences to large shipping which necessarily arose upon the Liverpool side. I do not say that the most has not been made of the Liverpool side; it is the wrong side of the river for the accommodation of large ships, and if they had spent millions more than they have, they could not make that side efficiently available for large ships.

The Liverpool side not suited for large ships.

Description of Wallasey Pool.

Wallasey Pool extended from the low water margin of the river immediately opposite to the centre of the business of Liverpool. I found it to be a creek, running two and a half miles inland, dry at low water, and 350 acres in area; there is thirty feet rise of tide in the Mersey, and it was dry at low water except a drain from the back country, which ran through it to discharge the surface water of about four or five thousand acres of land. The creek ran 2½ or 2¾ miles inland, having upon its margin a vast amount of land available for dock accommodation; very cheap agricultural land; between the top of the pool and the Leasowe Light there is a marsh of about four or five thousand acres, over which the tide at some remote period evidently passed, so that there were two mouths at that time to the river Mersey. It occurred to me that the proper mode of proceeding would be to recess the entrances to this as a great dock from the river, so that the large vessels, instead of having to lie in the river for an indefinite time, might get into this dock as soon as they could pass over the bar, which has only about nine or ten feet of water over it. Vessels get over the bar to come up the Mersey, and are frequently obliged to wait there before they can get into the Liverpool Docks. My idea was to make provision, if it were practicable,—and that it was so I had the evidence of Sir William

Entrances recessed from the river to a large dock.

Cubitt,—to receive those vessels at once into this basin, to be formed at the mouth of those docks, and so pass them into the docks. The whole plan was laid out with the view of being particularly adapted to large vessels, steamers, and others; to relieve the river as much as possible from crowding, by taking vessels into the dock at an early time of the tide; and to encourage private speculation in providing docks, and every convenience the port requires, on the margin of this creek, which, the Committee will observe, actually has upon its shores, surrounding what would be a stagnant pool, the same extent of frontage which the Liverpool Docks have. So that, instead of having the inconvenience of docking from a tidal river, where the tide runs often six knots an hour, and there is very considerable exposure, vessels would be able to get at once into this pool and find their accommodation upon the margin of it. It was my original idea, and I see no reason for altering my idea, that such is the plan which, as far as the public interest is concerned, will best suit the wants of the public.

J. M. Rendel. 25 April, 1855. For the accommodation of large vessels.

The Corporation of Liverpool were very large owners on the Birkenhead side, but the wonderful facilities for making canals, ship canals, and works over this flat land would entirely destroy the power of monopoly—no land-owning monopoly could interfere with the water being properly developed at Birkenhead. My idea was to make Wallasey Pool the highway to such docks as might be formed on the margin of the pool. I found, however necessary that small system of docks adopted at Liverpool was to meet the difficulties of the site there, that it was a monstrous inconvenience to the traders; because, inasmuch as the port is not only one of import but of export, it frequently happens that vessels have to be moved from one dock at the north end to a dock at the south end, and *vice versâ*; if through the docks, vessels had to be moved to make a passage; if through the river, there was a necessary increase of crowding the river, and the inconvenience of taking light ships into the stream; and my idea was, that Wallasey Pool would be a comparatively stagnant pool, into which vessels might pass from a system of docks upon its margin, but which would also give, which the Mersey cannot, accommodation to light ships. One of the great disadvantages at present at Liverpool is, that they have of necessity to accommodate the light ships in the docks in which business is done. Wallasey Pool would itself be a 150-acre dock, into which all light vessels would pass from the dock where they had discharged, and wait till they were to receive their cargo; and then, instead of having to inconvenience the vessels discharging cargoes, they would go to their respective docks and take in their cargoes. In consequence of the land adjoining Wallasey Pool being in the hands of private individuals, a ship within Wallasey Pool would have the option of going into the docks of any persons who had purchased land and established docks there; thus I combined the advantage of a large harbour, with the advantage of competition in respect of dock accommodation. That was

Wallasey Pool a highway and accommodation for light ships.

Public harbour and private docks.

J. M. Rendel, 25 April, 1855.

the original idea I had in laying out the docks as I did. This competition would be carried on between persons in the position of private individuals; and I think still that, for a port of transit for such an enormous district as Liverpool supplies, a large amount of accommodation should be left to private speculation. There was the opportunity of meeting the various wants of the various trades which it might be convenient to have in the neighbourhood; in truth, I think Wallasey Pool a most perfect natural dock, having upon its margin the most perfect natural means of accommodating the description of trade and the kind of business which is performed at Liverpool which I can imagine. It would not only be a highway to five miles of quay, and any works constructed there, but it would be a place for the collection of light ships, where they might be in perfect safety till they were required to take in a cargo; and they could then be removed to the dock where that cargo was to be shipped, without risk or inconvenience or even expense. The float is of such a size as to afford that accommodation without interfering with access to the place for loading and unloading, and it is 150 acres in area; its minimum breadth is 150, and its maximum 600 feet; it is an inland sea, in fact, perfectly exempted from the objections which apply to the river. I consider Wallasey Pool to be the great feature, having reference to the maintenance of a deep entrance to get into it, not at one hour each tide, but during four hours before, and four hours after high water, which is eight hours each tide; that, I think still, is the only way in which you will be able to clear the Mersey of the crowd of shipping which sometimes takes place. I have seen 200 vessels waiting to get into dock at a time. One great advantage of the Wallasey Pool system is, that you will have one main entrance, and as many entrances out of that as the circumstances of the case may require. An essential part of that scheme was a great low-water basin. I proposed to have between the part of Wallasey Pool, which I have described as a dock common to the system of docks to be made on its sides, a basin which should be open to the river, and which should be maintained by the water run off every tide from this float. It was proved in 1844, by the examination of all the engineers of the day, that it was perfectly practicable to maintain a basin of 30 acres, which should have at low water a depth of 12 feet, in other words, a greater depth of water than they have on the bar; so that any vessel which could pass over the bar, should, on coming up the river, always find a sufficient quantity of water in that basin to enter the basin, and to escape from the liabilities of damage in the river, and also that all the Irish and coasting steamers, which draw from 12 to 13 feet water on an average, should be able at all times to enter this basin to discharge their passengers, or cattle if they carry cattle, or take them in. That was a very material feature of the whole plan, and it was that which induced Parliament, after one of the most severe oppositions any measure ever had, to give the Birkenhead Dock Commissioners their Bill. The bar is 13 miles from

A harbour and highway for all ships.

Access eight hours each tide.

One main entrance.

Great low-water basin.

Shelter for all vessels at all times.

Bar of the Mersey.

Liverpool; the depth of water varies from 9 to 12 feet, sometimes it is a little better, and sometimes a little worse. [*By the Committee.*— A ship canal would save the bar; in 1828 there were some parties seriously alarmed about the existence of the entrance to Liverpool, and it was then proposed to make a ship canal across this low land I am speaking of, to a part of the Cheshire shore where you have always deep water, which, if anything should happen to Liverpool, is still the means of safety; and though you may smile about something happening to Liverpool, it is by no means impossible that something may happen to damage the entrance to Liverpool.] Into this low-water basin, vessels drawing less than 12 feet could enter at all times, at ordinary spring tides. Vessels at neap tides would come in drawing 15 feet at all times of the tide. At spring tides the first quarter flood would make about seven to eight feet water, and therefore they would come in from the first quarter flood to the last quarter ebb if they drew 18 feet water. The foreign trade of Liverpool is almost entirely in those large vessels; vessels are increasing rapidly in size, and they will do so still more, if Liverpool goes on increasing as she has done. Every year the importance of deep-water accommodation, and of sheltered entrances in the Mersey, is increasing. The two or three entrances on the Wallasey side will enable a much larger number of vessels to enter, than the numerous entrances on the Liverpool side. If you can extend the time for docking and undocking, it is tantamount to making additional entrances; also you do it more economically in the construction and in the after-work. Again, the docking a vessel with a basin of that description, and an entrance recessed 2000 feet from the line of the river, out of the stream of the tide, is wholly different from docking a vessel on an exposed shore like that of Liverpool; you have perfect command over the vessel, and in docking those large vessels the want of command is one of the causes of delay. It is the most difficult thing in the world to dock a large vessel upon an exposed shore. On the Liverpool side no low-water accommodation at all can be had; on the Liverpool side they must necessarily be exposed to an amount of silting, from that being the side upon which the stream of the flood tide impinges, and upon which the waves impinge; the tide and the waves are the transporting means of taking up the sand from the Burbo Bank, and carrying it along. Every entrance upon the Liverpool side must necessarily become a receptacle for the sand carried by the stream and the wave, which, being carried into those basins, subsides, and there is a deposit of that sand and of silt.

J. M. Rendel, 25 April, 1855.

Ship canal to the Dee.

Depth of water in basin.

Docking in a sheltered basin.

Silting of entrances on Liverpool side.

The Burbo Bank is a protection to the Liverpool side till the tide covers it, and inasmuch as the Burbo Bank is not 14 feet high at the highest part, and the tide rises 30 feet, it is only a breakwater so long as it remains uncovered. It would be a very good thing for Liverpool if there were no Burbo Bank there at all. It is some protection to the shore, but we are speaking of that kind of protection which is necessary to give the quiet water requisite for docking and undocking vessels. I

Protection from Burbo Bank.

J. M. Rendel, 25 April, 1855.

look to the Burbo Bank as the means of supplying the sand which gives all this difficulty; and what I say is this, the Liverpool Docks are not sufficiently protected by the Burbo Bank to justify that northern extension; and if there were no Burbo Bank, the Liverpool Docks, by a southern extension, would have the same facility of deep-water entrances that we have on the Birkenhead side. If this bank were away the sea would be heavier, but there is no sea that would enter further than the Clarence Dock; whereas, above, there is just as much room for extension to the southward as to the northward. I say, if you will go the north, the Burbo Bank is a breakwater to the extent to which it can be made available, but it supplies the material which prevents their maintaining deep-water entrances. It is true that a submerged breakwater is, to a certain extent, an advantage to a roadstead, because it breaks the ground swell; but as regards the surface wave I have seen a turmoil in the Mersey, arising from the breaking of the water upon the Burbo Bank, which does as much or more harm than a ground swell. The tide coming up, and running with a considerable stream into the mouth of the river over those banks, and the waves coming up heavily from the north-west, the Burbo Bank furnishes a supply of materials for the silting up, thereby increasing the difficulties of the maintenance of the sills on the Liverpool side, which, in my judgment, they will be unable to combat; and I have Mr. Hartley's authority in 1848 for saying so. On the Birkenhead side, not only have we less deposit, but it is of a very different kind, which is due simply to the more quiet stream and the absence of wave. The waves do not affect us on the Birkenhead side, and they do not therefore transplant to our shore the same heavy kind of matter that they do to the Liverpool side.

Supply of sand from Burbo Bank.

Liverpool on the wrong side of the Mersey.

I quite agree with what was stated by Mr. Telford, in 1828, that they have placed Liverpool on the wrong side of the Mersey. They have now a landing-stage upon the Liverpool side. The Liverpool people are meeting their difficulties as well as they can; they are natural difficulties, however, which money will hardly meet. The low-water basin was to be 27 acres, and to answer the purpose of a means of communication between the stream of the Mersey and the docks, and also a low-water harbour for coasting steamers and river craft. There is a vast amount of river traffic upon the Mersey, and there is great inconvenience on the Liverpool side, from the quantity of river craft passing out of those small docks; and this basin was considered of very great importance to the convenience of the river craft, and so it would be, because, if the river craft goes out in charge of a steam-tug, and you want to make a train of them, of five or six, you may do that in the basin at Birkenhead; but you cannot do it in the short basins upon the Liverpool side.

Low-water basin for river craft.

Application for Act in 1844.

The plan having been matured, it was considered expedient to come to Parliament in 1844, as a first measure, for authority to construct the low-water basin and the entrances to the float; also a small dock,

called the Bridge End Dock at that time, which is now represented by the Egerton Dock. Opposition on the part of the Dock Trustees at Liverpool was openly avowed. The plan was submitted in the previous autumn to the Admiralty, and it received the sanction of the Board. It was also submitted to the Commissioners of Her Majesty's Woods, as representing the Crown, which claimed the whole of Wallasey Pool as foreshore; as tidal land, in fact. Those authorities were so well satisfied with the plan, that they were prepared to make very large grants for the purpose of forwarding the scheme; and authority was given to them, in the Act of 1844, to make grants to the Birkenhead Dock Commissioners, acting in trust for the public, and empowering them to raise money by bonds, in the same way as they do at Liverpool.

J. M. Rendel, 25 April, 1855.

The Bill went into Committee in May, 1844, and was stoutly resisted by the Liverpool Dock Trustees and the Liverpool Corporation together, on the grounds, first, that docks were not necessary; next, if they were, that the scheme, as laid before the Committee, would be fatal or injurious to the economy of the river Mersey; that by cutting off 350 acres of the whole area of the Mersey from the natural flow of the river, we should be so reducing the quantity of water passing to and from the bar as to endanger the safety of the port. The promoters contended, and in that they were supported, not only by engineers but by mathematicians, that the cutting off of Wallasey Pool would really have the effect of sending that quantity of water up into the higher reaches of the Mersey, and therefore enabling it to perform greater service to the navigation than by passing in and out of Wallasey Pool. As far as our experience shows anything, the promoters' case was right, and the opponents' case was wrong. I presume that is admitted now. That point is generally waived. The opposition was very great in both Houses of Parliament, and imposed considerable additions upon the original scheme, besides which, the cost of the Act was very large, there were very great difficulties, and the promoters, to carry their Bill, made considerable concessions. The original estimate, as we came into Parliament, was 400,000*l.* for the low-water basin only, the reclamation of land, and the making of an embankment along the margin of the river. The opposition made it necessary to agree to a wall being built instead of an embankment; and in place of making this small basin, the opposition succeeded in compelling us to make it a large, free, basin; and instead of not building any works upon this ferry-pier, it compelled us to make a breakwater: these were considerable alterations, not included in the original estimate, and very expensive works. We made the Woodside Basin, as it is called, and the pier for the accommodation of ferry-boats, by the end of the year after we had obtained the Act. It was made imperative that they should be the first done. That was a work for the benefit of the public, for which the Trustees were to get no return at all. We have been chiefly working for the benefit of the public.

Grounds of opposition to Act of 1844.

Original estimate.

J. M. Rendel, 25 April, 1855. Act of 1845.

In 1845, we came again to Parliament, for the purpose of walling and deepening the whole of Wallasey Pool, the Crown giving up, out of 177 acres, about 150 acres for that purpose; in that application we came for 600,000*l.* to cover all those extra expenses of the Act of 1844, and to wall and deepen the float. The Crown made a free grant of the land; it was shown to the Woods and Forests, that these works were for the benefit of the trade of the Mersey, that there was no private interest involved, and that it was a matter of great importance to the trade of the country to facilitate the construction of these works, and to have the debt as quickly as possible paid off, so that there should be no tax upon vessels passing those entrances. There is no wharfage; the Dock Trustees' rate at Birkenhead is only a rate upon the tonnage of the ship as a passing toll on entering those docks; the Crown has given up to this time, out of the 355 acres which they claimed in Wallasey Pool, about 260 acres to the Trustees of the Birkenhead Docks, purely a public body, just as the Trustees of the Liverpool Docks. The Dock Company have had granted to them about 18 acres. (The grants were delivered in.) The land included in those grants was very valuable; in 1844, the Crown asked Mr. Hartley what he thought was the value of that land, and he estimated it at 800,000*l.* In the latter part of the year 1844, the Birkenhead Dock Company was formed, the parties connected with Birkenhead having purchased of the Corporation of Liverpool the leasehold interest in the various lands on the Birkenhead side of Wallasey Pool. The Liverpool Corporation acquired this land on the margin of the pool in 1828, and they sold a large portion of it to a variety of gentlemen connected with Birkenhead. The year 1828, was the year in which Mr. Telford had pointed out the advantages Wallasey Pool possessed for dock purposes, as I learnt from papers put into my hands in 1843. There were some gentlemen at Birkenhead and Liverpool, in 1828, who purchased this land from a Mr. Price, the then lord of the manor of Birkenhead, with a view of making docks there. They employed Mr. Telford, and he designed the works, and they were forming a company in London, but the whole of those arrangements were very abruptly terminated, by the Liverpool Corporation buying, as I was informed, the whole of that land upon which the docks were so to be made. The town clerk, as appears in the Commissioners' report upon the Corporation of Liverpool, says: "The plan of a company was generally believed to be in existence in the summer of 1828; and I believe the mayor of that day, and one of the members of the body corporate, Mr. Case, the oldest member, and the chairman of the finance committee, undertook, on their own responsibility, considering that such a scheme might militate against the interests of the town, to purchase all the property they could acquire in Wallasey Pool, in order to counteract the intended plan; in which statement I am confirmed by the entries of the Council. Having come to this determination, with the aid of the late town clerk, and some of the officers of the corporation, they effected purchases on

Works to be made free.

Land purchased by the Corporation in 1828.

the best terms they could, and made a report to the Council. It was a purchase, in short, by the Liverpool Corporation, in order to prevent the construction of docks at Wallasey." I was so informed in 1843. Up to 1843, nothing had been done towards the formation of docks upon that land ; I found the land perfectly waste. But it is fair to the Corporation to say that, according to the same report, the Corporation at that time had a plan of docks made, and they did as they were bound to do by their arrangement with the Dock Trustees, refer it to the Dock Trustees, but the Dock Trustees declined to prosecute any such works in Wallasey Pool. That land in the possession of the Corporation did lie waste from 1828 to 1843 ; I found it agricultural land, almost waste, in 1843. The parties who called on me first, in 1843, had taken leases from the Corporation ; I do not know the particulars of these leases, except that they took them with the intention of making docks, as I understood. The Birkenhead Dock Company was formed, and arrangements were made between it and the parties who had purchased of the Liverpool Corporation ; they came to Parliament in 1845, and obtained powers to make docks on the whole of the land, having bought the land at a very large price. The Dock Company was opposed in the House of Commons by the Corporation; they had made arrangements with the lessees of the Corporation. The Dock Trust obtained their Act in 1844. I have told the Committee it was part of my original plan to make docks on the sides of the large float; the Dock Company was formed for the purpose of making such docks on the Birkenhead side of the pool, and they treated with the parties who had obtained the leasehold interest in that land from the Corporation of Liverpool and acquired their leasehold interest ; they were private speculators. The Dock Trustees were to do no more than make this great float and the basin ; they were not to make docks branching off from the float ; and though in the Act of 1845, the Dock Trustees had the power to build a wall around the margin of the float, that wall was to be paid for by the respective frontagers as soon as they acquired the right to it. The Dock Trustees were to be charged with carrying out the works passed in the Act of 1844, and the deepening the whole of the Wallasey Pool 150 acres, the Company and individuals owning land around that float being the parties, as they might think proper, to make those docks. They were not acting in opposition to the purposes of the Dock Trustees, but in assistance of them ; the more vessels that should pass through the works, authorized by the Act of 1844, the more money the Dock Trustees would receive, and the earlier the debt would be liquidated, and the sooner these works would become free for the whole trade of the Mersey. [*By the Committee.*—The Dock Company and the Dock Trustees are perfectly distinct ; the Dock Company was acting only in furtherance of the general plan of making docks on the side of that large pool called Wallasey Pool ; and, with a view to those objects, obtained possession of the leasehold interests which

J. M. Rendel, 25 April, 1855.

Docks projected in 1828.

Formation of Dock Company.

J. M. Rendel, 25 April, 1855.

I have mentioned; it has no power over any part of the Crown land granted to the Dock Trustees, except the 18 acres which I have mentioned. There has been spent upon works for the Trustees 391,000*l.* The Dock Trustees have the right to the use of a road along the river wall of the north reserve; the Act defines that to be 50 feet; they have a right to use 200 feet, that is, an easement over it along the north reserve side of the great low-water basin. With the exception of the north reserve they own the whole of Wallasey Pool, pretty nearly 270 acres. The Dock Trustees, being the conservators of the float, have the right of preventing anything being done which would be injurious to the general economy of the pool.] The Dock Trustees had two Acts in 1844 and 1845; the Dock Company has one Act, the Act of 1845. The original design of the Birkenhead Dock Company was not carried out; 1847 came, and not only defeated the Birkenhead Docks, but many other equally good schemes. The original design of the Dock Trustees has not been completed, except a part; their difficulties have been financial chiefly.

Area of crown grant.

There is a total water area of 199 acres; a total land area of 73 acres, making together 272 acres given by the Crown to the Trustees, in trust for the traders of the Mersey.

Property of Dock Company.

The property of the Dock Company consists of warehouses, sheds, and dwellings for workmen, and land held on lease for 75 years, from the Corporation of Liverpool; the total area is 110 acres, or 540,000 superficial yards in the Birkenhead Estate; and the Herculaneum Dock Estate at Liverpool, which is 203,000 square yards, purchased for the purpose, as I understood, of being independent of the Liverpool Dock rates. The warehouses at Birkenhead would contain 50,000 or 60,000 tons of goods; they are very complete warehouses; one of the warehouses is given up to emigrants, and it has been formed into an excellent emigrant depôt, with every convenience for their health and comfort.

Contract to finish works, and Act of 1853.

In June, 1853, the Trustees received a proposal from Messrs. Brassey and Peto, to complete the whole of the works as authorized by Parliament, upon the terms stated in it, the basis of which was, that if the Trustees would come to Parliament, and make the bonds authorized by the Act, namely 600,000*l.*, carry interest, pari passu, with the bonds authorized by the Act of 1844, they would receive in payment, upon the terms therein stated, those bonds for the completion of the works. I have here the contract and the drawings attached, and it will be manifest to anybody, that it was gone into with extreme care and with all possible reference to public interest and the interest of the parties. An Act for the purpose of carrying out that was passed in August 1853; Parliament thought it so important that it waived its standing orders and enabled the Trustees to pass the Bill without giving the usual notices, or taking the usual steps which Parliament requires previously to the passing of an Act; and the Crown gave every possible facility for the passing of that Act, which would give the Trustees the power of carry-

ing out those arrangements with Messrs. Brassey and Peto. That Act having been passed, a formal contract was executed by Messrs. Brassey and McCormick, for the purpose of carrying out the works, within the time limited by the Act to three years. That contract was signed in December, 1853, and guaranteed by Messrs. Peto and Betts. The contractors were to receive bonds in payment for the works. You will readily imagine that with these works threatened at Liverpool, and the present state of the money market, those bonds are not very current, and the difficulty really is to press Messrs. Brassey and McCormick, and Messrs. Peto and Betts, to go on with the works in the face of such difficulties. The Trustees will insist upon the contract being carried out, but it is a monstrous hardship upon those individuals, in the present state of the money market, with such a scheme as this at Liverpool threatening us, to press them. They have laid out a very considerable sum of money; they have shut out the water from the whole of the low-water basin, and built a considerable part of the walls. They have gone to work as actively as could reasonably have been expected. The Trustees had every reason to anticipate, looking to the character of the contractors, that there would have been a greater amount of activity displayed. The contract was executed on the 10th or 12th of December, 1853. In January, 1854, came out the present measure at Liverpool, the one now before the Committee. It is notorious, that the contractors feel that the chance they have of converting the Birkenhead Dock Trustees bonds into money, is greatly impaired in the face of these additional works at Liverpool. Mr. Brassey came to me fresh from Liverpool, where he had heard of the scheme, and represented the difficulty it would involve him in, in converting those bonds into cash; and further that, with his large engagements, it would be difficult for him to proceed with the works as fast as he otherwise should have proceeded. The Trustees have insisted upon the work going on; they have remonstrated at the slow progress made with the work. They have not only remonstrated, but a very considerable amount of unpleasantness has grown up between the Trustees and the contractors. As might have been expected, the Liverpool Dock Trustees have wished to make the Birkenhead Docks unnecessary; in 1844, after the passing of the Act, they lowered the tonnage rates on a large class of vessels, the Birkenhead Trustees having no power to collect wharfage rates; they lowered their rates equivalent to 3 per cent.; that was in December, 1844, our Act having passed in August, 1844. In 1848, just shortly after the Morpeth Dock was opened, they lowered their several rates equivalent to 40,000*l.* a year. It is an odd coincidence, that whenever we have had a little opportunity for sunshine upon Birkenhead, something of this kind has always emanated from Liverpool. If Parliament were to sanction the proposed plan, the completion of the Birkenhead Docks will be seriously retarded; I believe it will most seriously embarrass the development of the Birkenhead Docks,

J. M. Rendel, 25 April, 1855.

Effect of projected works at Liverpool.

Opposition of Liverpool.

J. M. Rendel. 25 April, 1855. The Mersey a national port.

which I consider would be a calamity to the trade of the Mersey, which is not local but national. The Mersey is a national port, it is not a local port; it is not like London; there is a peculiarity about the trade of the Mersey which distinguishes it from the trade of every other port of the kingdom, and whatever interferes with increased facilities for the accommodation of large ships, will, by-and-by, reflect upon Liverpool itself. It will be impossible for Liverpool to render the cheap and complete accommodation for large ships which they require, and the Americans are too far-sighted to put up with those inconveniences long; they will do their business in large ships; the American trade must be accommodated, and the time is not distant when, if Liverpool does not give it that accommodation, Liverpool will suffer, because Liverpool is not the only port approached by a railway. The Thames is not a parallel case; Dock Companies must live by competition, not only in the price but in the quantity and quality of the accommodation; at Liverpool the accommodation is wholly in the hands of Trustees, and the public must be satisfied with what they choose to give them.

Peculiarity of Liverpool.

Constant revision by Parliament of public trusts.

It is an additional objection to this scheme, that it proposes to extend the period of their carrying out the works contained in it indefinitely; my own opinion is, and I do not hesitate to state it, that any trust carrying out works for the benefit of a large district of country, not locally interested, ought to come to Parliament oftener to give an account of its stewardship. The Liverpool Dock Trustees are dealing with monies not paid by their own town, but by the whole of the commercial community of England. The peculiarity of the trade of Liverpool is striking; there is nothing like it that I know of. Liverpool is the port for six or seven millions of people living at a distance from it. The Liverpool Dock Committee do not bind themselves in respect of any one work which they propose to execute; I do think it most inconsistent that Parliament should impose standing orders, and give parties the trouble of proving the compliance with standing orders, and then, when the parties have obtained their Act, that they should be allowed to carry out any plan they may think desirable, without coming back to Parliament and giving the reason why; if that is a good principle adopt it, but do not make it partial. If it be desirable to allow parties to depart essentially and entirely from, and to do works which are not even referred to, in the estimate, and which accommodate a different description of trade from that which the Parliamentary case made out, let it be general.

North end not suited for large ships.

I have heard the plan before the Committee described. After what I have said about the exposure of the north end, it is not, I think, a place for docks, and more especially not a place for docks for large ships; the further north you go, the more you must be exposed to wind and tide, the more the sills must be exposed to deposits, and if those docks are for large ships, the more objectionable they become. You can handle a small ship at the dock entrance,

because you have the command over the warps; but with a large ship, where the warps are necessarily heavy, and inclined at a great angle with the quays, the difficulty is very considerable. So far as the proposed dock is larger than any other dock, and so far as the entrances are larger, to that extent it is an improvement upon the other docks. In 1844 there was very great objection made to large docks; one of the objections against the Birkenhead scheme was, that there was never such a thing heard of as a dock of 150 acres; that it was ridiculous to talk about it. So far as the north shore docks are larger, I think it is a very great improvement: I do not think it will be possible to maintain eight feet below the old dock sill at the entrances. I know Mr. Hartley stated that even at the Clarence they lowered the sills 18 inches, but they found it was so difficult to maintain them, that they built them up again; and if that was the case at the entrance to the Clarence, recessed as it is, and far from exposure, the difficulties must increase as you go the north. They may scour, and do the utmost they can, but two or three days of hard wind from the north-west, with a spring tide, will make the water so foul with sand brought in by the stream over the Burbo Bank, that I doubt whether they can keep the sills clear. And there is this: everybody knows that the difficulty of handling large gates increases with their size; if you get anything wrong with a large pair of gates, damage is done in a very short time, and you cannot repair that damage. The sand collecting upon the sills will make the difficulties very much greater than if the gates were smaller. If they can get 8 feet of water, that will not be as good as 6 feet of water at the southern docks in rough weather. I am speaking of the difficulties of those north shore docks in bad weather; that is the time when you want those docks to be efficient; there is no difficulty in fine weather.

J. M. Rendel, 25 April, 1855.

Deep sills cannot be maintained at Liverpool.

The Liverpool Dock Committee should build enough warehouses upon the sides of the docks to keep private warehouses in check, and then I do not believe, in a port of transit, the Trustees will find it ultimately advantageous to spend more money in warehouses than will protect their customers to that extent. The more we interfere with private speculation in these matters, the more we check the legitimate expansion of trade. There is a sufficient check upon the warehousing system in the London Docks by the other docks, and the West India Docks, and St. Katharine Docks. The advantage of the warehouses in London is, that the merchant uses the dock warrant as a property; I do not see how it can be used in Liverpool where the docks are a trust.

Public warehouses as a check on others.

The map before the Committee will show the existing railway communication with Birkenhead and with Liverpool. From Birkenhead to Chester there is a railway, constructed at a vast expense; I think the Company paid 500,000*l.* for the extension of the line down to the docks, though only a mile and a quarter, on account of the enormous value of the land; that line is very efficient; Chester is quite a railway centre, the lines there radiate to Crewe; they go to Warrington, and

Railways to Birkenhead.

J. M. Rendel, 25 April, 1855.

through Warrington to Lancashire generally, and more particularly to Manchester and Stockport. Then there is a railway to Shrewsbury, and by Shrewsbury all the way to Birmingham, as well as through Crewe, which is the competing system. Then there is also now the line open to Hereford, and by Hereford into the whole of South Wales, so that South Wales coal is brought down to Birkenhead at the present time, I believe.

Canal communication.

As regards canals, there is the Duke of Bridgewater's canal by way of Runcorn, which is common to both sides of the Mersey. There is the Chester Canal, the Ellesmere Port Canal, which makes the Birmingham district and the Welsh district accessible from Birkenhead. Then there is the Irwell Canal, which makes Manchester and the whole district of Yorkshire and Lancashire accessible. As far as regards railways, and as to canals, I think the two sides are pretty nearly alike. There is at present a very considerable round to Birkenhead from Manchester, because the train must come down to Chester and then to Birkenhead, making two sides of the triangle, whereas the Liverpool line is in a direct course; it is very manifest, however, that the third side, this short piece which has been authorised, would be made, if the Birkenhead Docks were developed. The Birkenhead Company, in order to prevent the distance being a disadvantage, carry at the same rate to Manchester as from Liverpool.

Removal of timber trade.

My opinion is, that immediately you finish the outer basin and the float at Birkenhead, the timber trade will necessarily go to that side of the water, and for this reason; you are not called upon to make specific works for the accommodation of that trade; works made for the ordinary trade will suffice for the timber trade, and the land immediately adjacent to the float is so cheap, and so suited to the timber trade, that I believe it will go there. And then again, you have this element: you have competition there; you have a large amount of suitable land held by various parties, and if one proprietor will not give the accommodation at a reasonably low rate you have competition. Nothing could be more commodious for the timber trade than Birkenhead, supposing vessels chose to discharge through their ports, and it is a matter of dispute which is the cheapest; there is plenty of accommodation; there are wonderful facilities in Birkenhead for their doing so; they may have land for storage at a very low rent. Mr. Viner has 2000 acres of marsh land, all of that might be available for a trade of that kind, by cutting a canal through it.

Difficulty of removing a trade.

It has been stated to the Committee, as everybody knows, that it is very difficult to remove a trade, and I doubt very much whether they will remove the timber trade from the south, and if they do it will be by coercion. The Dock Trustees will have the power of saying, "We want the dock for other purposes, and you must move." My own impression is that the timber trade will by-and-by resist. I do not believe you will get the timber trade there. In the first place, it is difficult to remove it; and next, I think it would be more difficult to remove it to a disadvantageous locality such as that is; and my own opinion is, that by-

and-by, if Birkenhead can be finished, a large quantity of the timber trade will come there, because there is an enormous district of country better accommodated by Birkenhead than by Liverpool. The timber trade of Liverpool is enormous; it is for Wales as well as Lancashire and Yorkshire. By going to Birkenhead they will get rid of the difficulty of the floats. The Dock Trustees ought to carry out the wall which the law commands. In 1848 there was a distinct understanding that, in consequence of the public authorities allowing the dock to be made projecting so far upon the foreshore, the wall should be prolonged. If that wall be carried out, and this shore is to be enclosed, I cannot see why the canal should not pass over this shore. The whole story about these walls commences in 1844, when we were opposed. The question of what was most for the economy of the river was gone into fully, and it was then stated that it would be a great advantage, as a means of propagating the tidal wave up the harbour, instead of having this shelving shore in what was then called the neck of the bottle, to build walls not only across the mouth of Wallasey Pool and along the line of the Liverpool Docks, but to extend the wall some distance upon that side, and build a wall on this at the north shore. There is no doubt that, inasmuch as the effort ought to be to get the largest quantity of water passing in and out of the Mersey, that would be the best mode of so increasing the volume of water; and when, therefore, in 1848, the question was renewed by the Dock Trustees coming for this north shore plan, the Admiralty and the public departments said, "Do not terminate your wall abruptly; but if you will carry out your wall upon that line (*tracing it upon the map*), we will sanction it." I do not think, as a matter of conservancy, that the Dock Trustees, if they had not the benefit, should incur the expense of the extended wall. As regards the effect upon the opposite bank, it makes a great difference whether that wall is extended, or whether there is a recess at the north end of the wall. What took place in 1848 was this: I remember perfectly well discussing this with Sir Francis Beaufort and Captain Evans; there was a point discussed, how far this wall should be brought out; I remember giving this opinion: "Do not bring it out far, because, if you bring it out very far, the consequence will be that you will lose the beach here upon which it would be desirable for you to break the waves as much as you can, before they run along the line of the Liverpool Docks. If you bring this wall far out, the waves will be transported along the line of the docks to a greater magnitude than they will be, if you leave a considerable portion of beach." The question then was, how far out the wall might be brought? My own impression is now, as it was then, if that wall be finished, leaving still a sufficient amount of foreshore for the waves to break, it will do good to all parties rather than harm; still that will make, to some extent, additional silting along the line of the Liverpool Docks. If that wall is carried out, it will include a quantity of land belonging to the Duchy of Lancaster, which the Liverpool Trustees are stated to

J. M. Rendel, 25 April, 1855.

The sea wall at the north end.

J. M. Rendel, 25 April, 1855

have undertaken to purchase. If the timber trade is to be removed from the south to the north, I believe you can make cheaper accommodation upon that land, by the extension of the canal from the end of that large dock, than you can make inland; and the railway may be as well extended, or the canal joined on to such a canal as I am talking of, as remain where it now is. Upon the plan before the Committee, there is another basin at the extreme end, which is not shown upon the plan of 1848, to which the objection is increased by reason of its being still further north than was then proposed. In the plan of 1844, though the entrance was to be so far under the protection of the Cheshire shore, a breakwater was laid down and proposed.

Thursday, 26th April, 1855.

THE RIGHT HONOURABLE HENRY LABOUCHERE IN THE CHAIR.

C. Eveniss, 26 April, 1855.

Charles Eveniss, examined by Mr. Gregory.

I produce the Admiralty report upon the Liverpool Dock Bill, dated the 3rd of April, 1848. I also produce the surveying officer's report upon the same Bill, dated the 20th of March, with the evidence taken by the surveying officer upon his inquiry. I produce a copy of the supplementary report of the Admiralty upon the same Bill, dated the 17th of April; that was after having received a communication from the promoters of the Bill. These are the plans referred to in this report; the plans are signed by the two Mr. Hartleys, dated the 14th April, 1848, at least one of them is; the other is not signed by Mr. Hartley. They were both received by the Admiralty on the 17th April, 1848, and signed by Mr. Ward as being the ones referred to in the Admiralty Report. Upon one of the plans are the words "Plans accompanying the Admiralty Report of 17th April, 1848, and referred in conformity. (Signed) H. G. Ward." I understood the impression to be, from what was said, that these plans were the ones referred to in the 24th section of the Act; they are not so; these plans were deposited before the Act was passed. The only other document I have is a letter from Mr. Bramley Moore, the chairman of the Liverpool Docks, dated the 14th of April, which accompanied these plans. These plans are not deposited in accordance with the 24th section of the Act at all; they were deposited before the Act was passed; no plans have been deposited after the Act. In the report, which is among the papers produced, the following passage occurs: "The plans for the proposed sea wall and the docks do not appear by the evidence to be yet fully matured, and their Lordships will therefore only assent to the measure on the condition that the plans of the proposed works shall be submitted to their

Lordships for approval, and liable to such alterations and modifications as the Lords Commissioners shall deem requisite for the preservation of the navigation of the Mersey." No plans have been deposited since the passing of the Act. The powers exercised by the Admiralty would appear to be entirely distinct from the Board of Conservancy, of which the First Lord is a member; according to the 24th section of the Act, requiring plans to be deposited with the Admiralty, which, of course, is quite different from the Mersey Conservancy, the Board of Admiralty do, I believe, exercise the control and supervision in matters of this kind, as distinct from the Conservancy. [*By the Committee.*—I am principal clerk in the Harbour Department of the Admiralty; there is a special Conservancy Act for the Mersey, but whether it overrides the jurisdiction of the Admiralty I am not prepared to state.]

C. Evenis, 26 April, 1855.

Cross-examined by Mr. Merewether.

Cross-examination.

A search was made in the books of the hydrographer this morning, and nothing could be found in the books in reference to the Liverpool Docks Act since 1846. During 1848 nothing can be found. I cannot say that Captain Evans was not in communication verbally with the hydrographer upon the question of this sea wall. The present hydrographer was not the hydrographer at that time. The First Lord of the Admiralty is the head of the Conservancy Commission. I do not think there is a minute of the First Lord of the Admiralty, as head of the Conservancy, ordering that matters in that department, having reference to the Mersey Conservancy, should be transmitted through Captain Evans. I do not think such a minute has ever reached the Admiralty from the Mersey Conservancy.

James Meadows Rendel, further examined by Mr. Calvert.

J. M. Rendel, 26 April, 1855.

About 146,000*l.* has been expended upon works completed and in operation. The revenue last year from the works so completed was, I think, a little in excess of 9000*l.* for tonnage rates alone. There is no power to collect wharfage rates. The revenue is rapidly increasing; that is about 6 per cent. upon the outlay; that is from only one side of the Morpeth Dock, the other side not being at present available because of the bridge, which is removed from the passage. It is now working with that deficient quayage upwards of 19,000 tons per acre per annum; accommodating also an enormous number of small river craft, because they are charged nothing. My own impression, as I stated to the Committee yesterday, is this: that as far as the accommodation of large ships is concerned, the south, and not the north, is the direction in which to go on the Liverpool shore of the Mersey, and also so far as the convenience of the traffic of the country is concerned. I heard Mr. Barber's evidence about a better arrangement of the present docks, and the working of those docks more equally. I can perfectly understand that the present docks of Liverpool, having a very large frontage and quayage, might be worked more advantageously than now if they had room in

Revenue from works at Birkenhead.

Dock extension at Liverpool should be to the south.

J. M. Rendel, 26 April, 1855.

which to stow ships for sale, and light ships. The principle upon which the present dock system is laid out is that of having a small water area and a very considerable extent of quay frontage; that involves a considerable difficulty in reference to light ships. They will do much by a more general introduction of improved machinery in unloading and loading vessels; because, within the last four or five years, improvements have taken place in apparatus for loading and unloading, which I know in our docks in London make one berth very nearly equal to two. My impression always has been that a change in the system of working the docks by improved crane-power would be desirable, and the increase in the size of vessels resorting to this country, more particularly to Liverpool, would make it a very advantageous arrangement at Liverpool to have more water space in which they could place vessels waiting to sail, and vessels waiting cargo. It is desirable for the trade of the country—I do not say for the town of Liverpool—that you should exhaust the best sites upon the Mersey, whether upon the Cheshire or upon the Liverpool side, for docks, before you resort to the worst. I am not now speaking of it in reference to the Liverpool interest, or the Birkenhead interest, I am speaking of the question in reference to the commerce of the country; and I do think that it is very desirable that, dealing with the question of docks upon the Mersey, Parliament should impose upon those who are to supply the docks the consideration of what is the best site in reference to that commerce, rather than what is the best site in reference to a particular interest. I believe you cannot supply the deficiency of dock accommodation which perhaps now exists, and which certainly will exist, if America goes on sending trade to Liverpool as she has done the last twenty-five years, except by spending your money upon the Wallasey side instead of upon the Liverpool shore. Nature points to that result. It is the deep-water side; it is the weather side. You can have accommodation for large ships at a cheaper rate, and of a more complete kind. Wallasey Pool would admit of more docks upon its margin than the whole of what the Mersey now affords upon the Liverpool side. The Trustees could obtain better accommodation, for a smaller sum, by going to Birkenhead, than by laying out their money on the Liverpool side. Acre by acre of dock you can get much cheaper, and better accommodation there, than on the Liverpool side. I do not know what the Birkenhead interests are prepared to part with their property for; but it is clear to my mind, that if the Birkenhead works were taken up in their present state, and carried out to completion, it would be very much more economical, as well as complete, than the other works which I see upon the plan. There cannot be two opinions upon it. If the Birkenhead proprietors were willing to part with their property and interests at 1,200,000*l.*, another 1,000,000*l.* would complete the whole thing; so that, for 2,200,000*l.* you could have the entire accommodation which Birkenhead could afford, and with this advantage, that you provide for any future amount of accommodation upon the

Difficulties of present arrangements at Liverpool.

Best sites should be exhausted.

American trade cannot be accommodated except at Birkenhead.

Cost of complete accommodation at Birkenhead.

most economical terms, as I have already stated. Upon the side of the Wallasey Pool you have an inexhaustible quantity of land; you might extend dock accommodation infinitely; and if anything should happen to create difficulties at the entrance of the Mersey, there is a remedy. On the Birkenhead side, the deep water at the mouth of the Dee comes up close to the shore. There are 20 and 30 feet water close up to the shore. The entrance to the Dee has a bar; but there is a channel between the entrance to the Dee, which has thrown up its sand-banks, and between the entrance to the Mersey which has thrown up its sand-banks. Mr. Telford proposed, partly with a view to avoid the bar, and partly with reference to the town dues, that ship canal, which would be an entrance into the Mersey, independently of the bar; and although there is no channel in the world better lighted and buoyed than that of the Mersey, the very fact that a port such as Liverpool is liable to a bar of that kind is a very great drawback to it. Spending money on the Cheshire side, if anything should happen to the present entrance to the Mersey, is really providing for such a contingency.

J. M. Rendel, 26 April, 1855.

Another entrance to the Mersey.

[*By the Committee.*—A million will finish the works both of the Dock Trustees and the Dock Company, and such adjoining docks as might be necessary for availing yourselves of the advantages of Wallasey Pool; and as to the timber trade, Mr. Viner has a large estate here of 2000 or 3000 acres, I suppose, and he has, in building his walls, wisely put in an entrance, and he could extend canals through that low land at a very cheap rate, and on the banks of those canals there might be any accommodation for ship-building and the timber trade.]

A new channel is now breaking out into the Mersey, but the surveyor of Liverpool will give you better information than I can; Lieutenant Lord is the marine surveyor; I am told that he has made a report upon the critical state of those channels; I have not been able to get a copy of it; but I am told he has.

New channel to the Mersey.

I was present during only a part of Mr. Smith's examination; it is not my experience that 17,000 tons per acre per annum was as large an amount of tonnage as could be conveniently worked in the docks. The St. Katharine Dock works more than 26,000 tons per acre; the London Dock more than 23,000; the Morpeth Dock, with only one side, worked in the last year very nearly 19,000 tons; it was made as a temporary passage originally, and is very narrow.

Tonnage per acre.

Cross-examined by Mr. Merewether.

Cross-examination.

There are great physical advantages on the Birkenhead, and physical disadvantages on the Liverpool side; there are many natural advantages at Birkenhead, and many natural disadvantages at Liverpool; the number of entrances and the difficulty of docking in certain winds are among those disadvantages. There are some docks there, and a considerable quantity of trade; that trade and those docks are managed by a body of gentlemen, not having a farthing of pecuniary interest in the

J. M. Rendel, 26 April, 1855.

management. You have referred to the number of times I have been examined before Parliament in reference to the Birkenhead Docks. Upon no occasion have I said that the Dock Committee of Liverpool have not done the best they could, and that their engineers are not men of skill and ability. I am ready to bear testimony to that now.

In 1843, when I was first called on to prepare plans, the parties who employed me imposed no secrecy upon me, and the surveys were carried on at Birkenhead in the way in which surveys ordinarily are, and therefore I presume it must have been known. I cannot tell you in whose hands the adjacent lands were. The parties who employed me had acquired certain lands, as I understood, from the Liverpool Corporation, and their object was to make docks upon those lands. I declined to design docks upon those lands, upon the ground that Wallasey Pool was in itself so important with reference to public accommodation. I thought, at all events, the entrance works ought to be made by a public trust, and the Crown ought to contribute largely land in Wallasey Pool to such an object. The gentlemen who first came to me were Mr. Jackson, Mr. Laird, Mr. Brownrigg, and Mr. Potter; Mr. Brownrigg and Mr. Potter being largely engaged in mercantile transactions at Liverpool, and Mr. Jackson and Mr. Laird being Birkenhead gentlemen. When the plans for docks were developed and became public, I was aware that the land adjacent to those docks was their property, and they will tell you, as I do, that the object of my first employment was to design docks in connexion with that land; but they will also tell you that I declined to interfere with the general capabilities of Wallasey Pool. I believe that the land speculation at Birkenhead did not commence till the Act was obtained. I believe that the violence of the opposition was a great means of bringing about that violence of speculation, because the whole case became so notorious, from the opposition the Birkenhead Bill encountered in passing through Parliament in 1844, that everybody looked at Birkenhead as they would at California. Birkenhead was not avowedly in opposition to Liverpool, until Liverpool took the position it did in opposing it; and then Birkenhead was obliged to seek the assistance of the manufacturing districts, and then it became certainly a decided opposition to Liverpool. The hostile attitude of Birkenhead to Liverpool was after the violent opposition to which I have referred; I should think after the year 1844. Of my own knowledge I know nothing about the land transactions at Birkenhead; I never had the smallest interest in the land transactions at Birkenhead; there were large transactions in land undoubtedly, and unfortunately those transactions were numerous. The 400,000*l.* under the Act was very easily raised, and before we had expended upon the works 200,000*l.*, those monies were exhausted; but how that arose, whether the Dock Commissioners made improvident loans, or how they did it, I know only from having heard it in common with the rest of the world. The Dock Trustees advanced in the beginning, to the Birkenhead Commissioners,

Docks as first proposed in 1843.

J. M. Rendel, 26 April, 1855.

a large sum of money for various town improvements which were going on, and I have no doubt the parties thought they were lending money to persons who would repay it when it was required.

The Dock Company, in consideration of what they were pleased to call my useful services in designing their works, allotted me 100 shares, and I paid down 10,000*l.*, and I am content to leave it till I get it back. I have never bought or sold a share, or speculated with respect to it at all, nor with respect to anything at Birkenhead. The price of land not only greatly increased upon the passing of the Act, but there were also large transactions in it. I never valued an acre of the land, nor bought nor sold one. I did not say the Woodside Basin was the result of the opposition of the Liverpool Corporation and the Dock Trustees, but I think the Liverpool Corporation and the Dock Trustees were the instigators of all the opposition ; I do not know that I mentioned any other opponents to the Bill ; I believe they were the virtual opponents. The Woodside Basin was in consequence of the opposition of traders on the river, who showed to the Committee that they were entitled to beach at present where our works would prevent their doing, and for which the Woodside Basin was given as a compensation; but I believe that that, like all the other oppositions, was nursed and fostered by the great opponents to the Bill, the Liverpool Corporation and Dock Trustees. No part was taken openly in that by either of those two Corporations, but I believe, and I have good reasons for believing, that if the Liverpool Dock Trustees and the Corporation had not opposed us, there would have been no opposition of the kind you now refer to. That Morpeth Dock was made without Parliamentary powers to make it, very much upon the same principle as you have departed from your plans at Liverpool ; but Parliament afterwards sanctioned that dock, altered as it is ; the sanction of Parliament was necessary, not to enable rates to be taken, but because an entrance had been made through the Woodside Basin, which entrance was indirectly forbidden in the Act of 1844, which was required to be given up wholly to the river craft you have been referring to; therefore the illegality was to pass vessels into the Morpeth Dock through that, which was to have been a free basin. I said that I believed this Liverpool scheme would not have been brought forward had they not known the Birkenhead Trustees were going on with their contracts with Mr. Brassey; the report on this scheme was presented to the Dock Committee in August, 1854. There was no difference with Mr. Brassey ; he has had every farthing up to the present time he is entitled to under his contract. The Trustees have not made a single lapse ; they found that Mr. Brassey was not pushing the works, when he came to me and told me that you on the Liverpool side were getting out a great scheme, which would seriously interfere with the credit of his bonds ; no differences had arisen between Mr. Brassey and the Trustees till Mr. Brassey was alarmed by the works being pressed on the Liverpool side of the water. Mr. Brassey had no kind of excuse to offer but that.

Opposition of Corporation and Dock Trustees to the Act of 1844.

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[*By the Committee.*—The state of the money market undoubtedly imposed difficulties, but unquestionably those difficulties were increased, in Mr. Brassey's apprehension, by the getting out of this scheme at Liverpool. I do not know whether it entered into Mr. Brassey's consideration, when he took the contract, that he was open to schemes of this kind being put forward on the part of the Liverpool Trustees; but unquestionably, at the time that he entered into his original contract, there was no such project. I think these questions had better not be pressed.]

Effect of new project on Mr. Brassey.

In every interview I have had with Mr. Brassey upon the subject of going on with these works, and they were numerous, the reason he has urged with me was, the impossibility of getting cash for the bonds of the Trustees, in the face of such opposition as they would have from the works on the Liverpool side; because, as a matter of course, the value of the bonds will be depreciated by the competition. Mr. Brassey's allusion with me was, to the depreciation in the market of those bonds, by reason of the great works to be carried out at Liverpool. My firm belief is, that Birkenhead will one day hold its own; the only difficulty with me is when. I do think, and I am quite sure you, and the whole of the parties whom you represent, should sympathise with parties who have advanced so much money at Birkenhead, now perfectly idle; and if the commerce of the Mersey, which is not Liverpool, but national, could be accommodated by finishing those works better than by a larger outlay upon the Liverpool side, I do think, and I say it boldly, it is a hardship upon those parties who have laid out their money, whether well or ill-administered is another question, not to give Birkenhead a fair chance.

Re-examined by Mr. Calvert.

I refused to act on the original proposal to me in reference to works in Wallasey Pool, in the first instance; that was with a view to their being made of a more national character. I interested myself with the public boards to get a free grant, and I felt compromised that those works were sacrificed, seeing that the Crown had granted such a large extent of land. After my plan came out, the value of the land rose very considerably. The Corporation profited, like everybody else who had land to sell. After having so parted with their land, they opposed the Bill for making docks. The contract with Mr. Brassey was signed in December, 1853. The first words of the Liverpool report are, "The special sub-committee, appointed on the 12th January, 1854, to consider and arrange plans." My interview with Mr. Brassey was after that. Mr. Brassey made a tender of a sum at which he would do the works, if the financial arrangements could be made under a special Act of Parliament.

By Mr. Gregory.—This is a copy of the plan of the Liverpool Dock Trustees, deposited the 8th November, 1847, and authorised by the Act

of 1848. None of those works upon the blue land upon the plan now proposed appear in that plan of 1847. The blue is the same land, but they are totally different works; the works represented upon the blue land do not appear upon the plan of 1848. Previous to the construction of the wall which bounds the pink land at the north, it was an open beach, upon which the sea broke freely. The building of a wall upon that shore will necessarily make a stronger stream upon the Cheshire shore; and the stronger the stream, the greater necessity for a strong shore there, as a necessary consequence of the wash on a weak one is a great waste. I know the Leasowe Embankment. I had a letter from Birkenhead this winter, informing me that there was great danger that the sea would break through there and swamp Birkenhead. I did not feel much alarmed, because I thought it would make a very good new channel, but if its disruption or demolition should take place, the consequences would be very disastrous to all the land within the embankment. I do not think it would be disastrous to the Mersey. I think it is very desirable that a wall should be built upon the Cheshire shore, and I think it is made more desirable, if not necessary, from the wall being built upon the Lancashire shore. It was always contemplated that it would be well to extend the wall of the Birkenhead Docks along the Cheshire shore, to the same extent as along the Lancashire shore.

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Beach at north in 1848.

Waste on Cheshire shore.

Leasowe embankment.

Examined by the Committee.—I have no fear but that if Birkenhead is placed on a level of fair equality with Liverpool, it will have its fair share of trade; I never had. I think if the whole scheme now before the Committee is carried out it will be a most serious interference with Birkenhead. Anything that depreciates the present greatly depreciated condition of Birkenhead, in a financial point of view, will necessarily delay the carrying out those works; as if you create competition to the extent this plan would unquestionably do if authorised; it is precisely the kind of accommodation which Birkenhead is seeking to afford. For instance, a great case has been made out before the Committee as to the present want of shipwrights' yards at Liverpool, and cheap accommodation for the timber trade; those are the description of trades which Birkenhead is especially calculated to accommodate. The natural advantages of Birkenhead, in the case of those north works being completed, would not enable it to compete successfully with Liverpool, and for this reason: all this land would only be available by carrying out these outer works. The difficulty is to raise money in the present depressed condition of Birkenhead on its bonds to carry out these works. If we could raise the money for carrying out these works, I should not have the smallest hesitation in saying—authorise Liverpool, if you please, to expend 4,000,000*l.*, 5,000,000*l.*, or 6,000,000*l.* The credit of Liverpool in getting money upon their bonds is, in the present state of things, infinitely better than the credit of Birkenhead; it is clear also, that being the case, that the persons who have to lend their money on bonds (for

Injury of proposed scheme to Birkenhead.

Money cannot be raised on the credit of Birkenhead.

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it is not a joint-stock speculation) would feel that their credit was greatly depreciated by the fact that the very description of accommodation which Birkenhead is pre-eminently calculated to afford is to be created at Liverpool at the very time when they are about to afford it, because it is out of the question to suppose there is any demand in the port of Liverpool both for the Birkenhead works and for the Liverpool works. There is no such demand; there can be no such demand for years to come. Birkenhead alone will very nearly equal the whole of the accommodation at present at Liverpool. The difficulty is in making the works, not in working them afterwards. Though, notwithstanding anything that can be done on the Liverpool side, it would be a successful speculation to make works of this description upon the Birkenhead side, financiers tell us now that the public would not assist with money to enable it to enter into that competition. There is no chance of it.

Not a Joint-Stock Company.

If Parliament were prepared to say to a joint-stock company, We will transfer to you the whole of this trust property, the whole of these trust works, and allow you to create a great joint-stock concern upon the shores of the Mersey, that would be one thing; but our difficulty is, that the persons advancing money upon bonds have no interest in those bonds beyond the common interest which they carry; there is no ulterior interest. The Government, on the part of the public, has given an enormous assistance to Birkenhead; that assistance was valued by Mr. Hartley at 800,000*l.* in land alone. The Government has always been of opinion that there were great natural advantages. In Birkenhead, affairs have not been properly managed; they have been managed very improperly; their position here to-day as suppliants is entirely owing to that. The natural facilities of Birkenhead cannot be questioned. Let any collection of engineers be appointed to investigate the whole case of accommodation for docks in the Mersey, and let the result be determined by that. I am quite prepared to say that such an ordeal might be gone through with great advantage to the public, and let the two docks scheme be judged of in that way. I believe it would be infinitely for the public advantage that the two systems and interests should be amalgamated under one united management. Only constitute a trust which shall be strictly impartial. There is nothing in the nature of the competition which now exists, or which can be supposed to exist under the circumstances, which will give any advantage to the public to be put in comparison with that which would be derived from the benefit of a systematic joint management. If you could constitute a perfectly impartial trust to represent the trade of the country, and not local interests, and if you put the whole of the Mersey under the control of that trust, to carry out the accommodation which the marvellous increase of the trade demands for docks, whether it be on the one side or the other, I believe you would do the utmost service to the trade of the country. I have never turned my attention to the constitution of such a trust sufficiently to be able to make to the Committee any suggestion

Mismanagement of Birkenhead affairs.

Amalgamation under an independent trust.

as to what would be the proper constitution of the trust; but I am satisfied that if the trust is to act harmoniously and beneficially, it must not be a mixed trust, but a trust which should be anything but mixed up with interests first on one side of the water and then on the other side; and it must depend for its support entirely upon being occasionally brought before Parliament. I believe mixed trusts for great interests of this sort are the worst form of trust you can have. The interests of Liverpool as a port of transit, and of the rest of the country as being supplied with the means of consumption through that port, are the same; but I am doubtful whether they are always viewed as the same. I have just stated my feeling as to all trusts, which are mixed trusts, being bad things. I believe it is bad for the Liverpool Corporation and the Trustees that they are married; I think the union is an unnatural one. I have stated what I think objectionable. If I were asked what I thought desirable, I should have more hesitation in coming to a conclusion; but of this I am quite sure, that local interest is always inconsistent with the general interest, or will be found to be so. The admixture which now takes place in the Liverpool trust between the nominees of the Town Council and the dock ratepayers is objectionable, and I am quite sure the history of Liverpool will illustrate that fact. The history of Liverpool shows that very nearly the same difficulties that we have had at Birkenhead were incident to the first establishment of docks at Liverpool. I believe it to be matter of history that members of the Dock Trust of Liverpool named by the Town Council and named by the ratepayers have acted in an antagonistic manner; I do not know to what extent. In 1847 I think there was a question whether the docks should not be rated to the town. That was a question of difference between the Corporation and the Trustees. I believe that the members of the Trust elected by the Corporation and the members elected by the ratepayers took different sides upon that question. I think you will find that in the report of the Municipal Corporation Commissioners these things are gone into very fully. The difficulty of bringing the negotiations for amalgamation to a successful issue has not, I think, turned solely upon money. I believe the Liverpool Dock Trustees to be a perfectly impartial and a well-constituted body.

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Mixed trusts for large works bad.

Union of Corporation and Dock Trust unnatural.

Antagonism of nominees of Council and ratepayers.

I heard the evidence of the harbour master of Birkenhead, as to the alterations he thought ought to be made in the present system of dues, to place Birkenhead and Liverpool completely upon an equal footing; I conceive his views to be correct; they were very clear, namely, the establishing such a reciprocity between Liverpool and Birkenhead as was consistent with the interests of both, and with those of commerce. An alteration in the charges now paid by vessels not entering the Liverpool Docks, but discharging in the stream, would be some assistance to Birkenhead. My own impression is that it would be quite consistent to have a year or two of grace to see if they go on, and if they do not,

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I am the last man in the world that would say, inconvenience the trade of the Mersey. But it is for the public interest that Birkenhead should have an opportunity of carrying out these works and insisting with proper firmness on the contractors carrying them out. I think that they would not be able to carry their works out, though relieved from the disadvantages under which they at present appear to labour as regards rates. I think that is absolutely necessary, even for the convenience of the trade at present. But I think, unless we are relieved from the dread which the contractors have of the whole of this scheme being authorised, we shall not be able to succeed. I was told by one of the large bondholders yesterday, that he was prepared himself to put down an additional 50,000*l.* to go on, if they could only be free from the dread they have of this scheme; that was without any view to an alteration of the Liverpool charges. The portion of the Birkenhead works now in use yields 9000*l.* per annum, as an income; the dues at Birkenhead, as compared with Liverpool, are moderate; there are no wharfage dues. The same trade would bring at Liverpool 18,000*l.* a year. The Liverpool Dock Committee are now adopting the same mechanical contrivances as are in use at the London Docks. I said that the commerce of Liverpool should be looked upon as a national, and not a local concern; the management should partake somewhat of a national representation, if you could have an harmonious one; great things are effected chiefly where there is harmony. I should say the best trust would be about eight gentlemen altogether, responsible to Parliament. I would not have them wholly resident in Liverpool; the business of the port is national; the accommodation in the way of docks ought to be with a national and not a local view. I cannot say that the plan before the Committee partakes very much of a national character. Having been long conversant with the trade of the Mersey, and looking upon it as a national trade, I am of opinion that this is not the best plan which could be adopted; if the whole question what should be the plan for the accommodation of the trade of the Mersey were investigated, I do not think this plan would be the result. Without reference to Birkenhead at all, I think this scheme on the north is not the best which could be devised.

Suggested trust.

I should not think it desirable that the Committee men should be residents in Yorkshire, or any distant part; my opinion is that you should have a trust perfectly independent of local interest, and wholly therefore interested in the trade of the port, and having no Liverpool or Birkenhead or any other bias. I should not advise resort to Government officials. If this subject is to be pursued, I should say this—I cannot call it an independent trust where the Trustees and the Corporation meet together, and the Corporation have a veto upon the proceedings of the Trustees. I think I may now state what I mean more particularly. I mean this beyond all question: the Corporation of Liverpool, however well intentioned, being sent to perform the will of

Trust not independent.

small tradesmen and shopkeepers of Liverpool, have no very kindly feeling to any interest but their own; I think that if you had a trust composed entirely of merchants, elected from merchants entirely independent and completely free from that feeling, it would be a more powerful trust, at all events, for the management of this enormous estate. I would dissever the connexion between the Dock Trust and the Corporation of Liverpool. Let the dock ratepayers be the parties to elect, I believe that would come, as nearly as you can at present, to a good trust. I am satisfied that a local interest is not for the benefit of the general trade. I am not at all speaking of individuals, but of the system. I would introduce those parties who must pay the dues, whether resident in Liverpool or elsewhere.

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Trust elected by ratepayers.

Mr. Merewether handed in a copy of the following minute of the Board of Admiralty, and signed by the Duke of Northumberland: "That in future all matters relating to the conservancy of the river Mersey be sent by the Admiralty to Captain Evans, the acting conservator, to be by him submitted to the other Commissioners of the Conservancy of the river Mersey, together with any remarks which the hydrographical or harbour department of the Admiralty may suggest for approval or disapproval, of the said conservancy matters, and no report relating to conservancy questions about the river Mersey be presented to Parliament without being first presented to the Lords Commissioners of the Conservancy of the river Mersey."

Admiralty minute as to Mersey Conservancy.

Monday, 30*th April*, 1855.

THE RIGHT HONOURABLE HENRY LABOUCHERE IN THE CHAIR.

Mr. Hardy stated that in the event of the Committee determining that the preamble of the Bill was proved, it would be necessary for him, in consequence of the statement in the preamble, that the Trustees had, in pursuance of the recited Acts, proceeded in the construction of the various modes thereof directed to be made but that the same had not yet been fully completed, to ask the Committee to insert a clause that nothing contained in the Act should be taken to legalise the works so referred to in the preamble.

Mr. Serjeant Wrangham stated that a proposal had been made on the part of the promoters this morning to which there was every probability that his clients would accede, and if such should be the case, it would be necessary to ask the Committee to adjourn the further consideration of this Bill and of the other Bills in the same group, all of which were more or less affected by the arrangement contemplated. He

therefore proposed that the Committee should now adjourn for a fortnight, in order to give to the different parties an opportunity of considering and carrying out the terms of arrangement which had been proposed and conditionally accepted.

The Committee inquired whether, pending the proposed arrangement, there was any reason for postponing the consideration of the Liverpool Improvement Bill.

Mr. Serjeant Wrangham stated that one bill in the group was so connected with another, that it was necessary to consider them as a whole.

Mr. Merewether stated, that he did not assent to the suggestion of Mr. Serjeant Wrangham, and that the Liverpool Improvement Bill was an entirely distinct measure, which might be separately considered by the Committee.

Mr. Serjeant Wrangham stated that his clients were opposing the Bill with reference to the town dues, and it would be impossible for them to allow that Bill to go on without opposition on their part, unless they were certain that opposition was unnecessary, as it might be if the arrangement to which he had referred were carried out.

Mr. Hope Scott stated that he represented before the Committee the Liverpool Dock Trust, and not the Liverpool Corporation. Whatever negotiation had been going on between the parties had been a negotiation between the Liverpool Corporation and the parties representing the interests of Birkenhead, and as his (Mr. Hope Scott's) clients were not parties to that negotiation, and were not apprised of its nature, he was not in a position to assent to the adjournment for so long a period as a fortnight, but would consent to an adjournment until to-morrow morning, when, if he should be satisfied that a binding agreement in writing had been come to by the parties to the proposed arrangement, and that they were authorised to make it, he would be in a condition to state to the Committee what course his clients were prepared to take with reference to this Bill.

Mr. Serjeant Wrangham stated that if it was desired by Mr. Hope Scott, and if the Committee did not object to it, he would not oppose an adjournment until to-morrow morning.

It was intimated to the counsel for the several parties that the interests of the public were strongly involved in some agreement being come to, which would make the whole dock system on both sides of the river Mersey one system, and which would put it all under the management of one public trust, so that the whole should be conducted purely and simply for the general interests of commerce, which must in the long run be for the interest of the town of Liverpool.

Tuesday, 1st May, 1855.

THE RIGHT HONOURABLE HENRY LABOUCHERE IN THE CHAIR.

Mr. Serjeant Wrangham stated he was sorry to say that, notwithstanding what had passed yesterday, the Dock Committee had refused to consent to any postponement of the Bill, and therefore there was nothing left for him but to proceed with the statement of his case.

The Chairman stated the Committee would wish to hear Mr. Hope Scott's objection to the postponement.

Mr. Hope Scott stated that the objection to the postponement was the fear that they would not get their own Bill passed, which was of essential importance to the town of Liverpool, in consequence of the delay that would occur from obtaining the consent of all the parties necessary to the arrangement that Mr. Serjeant Wrangham had spoken of.

Mr. Serjeant Wrangham was heard in answer to Mr. Hope Scott.

The Committee retired to deliberate, and on their return the Chairman stated that the Committee had considered the point, and he was desired to inform the counsel that they were unanimously of opinion, under the circumstances, that the further consideration of the Bill ought to be postponed until the whole question was before them, it being asked to carry an arrangement into effect after an agreement shall have been sanctioned, if sanctioned it should be, and the Committee were of opinion that they could not satisfactorily go into the matter without having the whole subject before them.

Mr. Hope Scott stated that under those circumstances it was his duty to bow to the decision of the Committee, but he trusted that the Committee would bind the parties down to bring the matter before them again in as short a time as possible.

The Chairman inquired of Mr. Serjeant Wrangham what time he would require.

Mr. Serjeant Wrangham stated that, with respect to the Birkenhead Dock Company, the Act required fourteen days' notice to be given to the parties, to be inserted in a local paper, and therefore he was afraid he could not ask the Committee to adjourn for a shorter time than till Wednesday the 23rd.

Mr. Hope Scott was heard to object to the length of time for the adjournment.

The Chairman stated that if fourteen days' notice was necessary, it would be impossible to have an adjournment for a shorter time.

Mr. Hope Scott stated he would offer no further opposition to the time.

Wednesday, 6th June, 1855.

THE RIGHT HONOURABLE HENRY LABOUCHERE IN THE CHAIR.

The Chairman read the following Report from the Board of Trade:

Report of Board of Trade.

The Right Hon. Henry Labouchere, M.P., &c. &c.

Office of Committee of Privy Council for Trade, Whitehall, June 4, 1855.

SIR,—I am directed by the Lords of the Committee of Privy Council for Trade to inform you that in compliance with the wish of the Select Committee of the House of Commons, of which you are Chairman, conveyed in your letter of the 25th ultimo, my Lords have carefully considered the questions raised by the various Bills relating to the Liverpool and Birkenhead Docks, especially with reference to the proposed arrangement for transferring the Birkenhead Docks to the Corporation of Liverpool, and in reply, I am to submit to you the following observations:

There are some discrepancies in points of detail between the clauses which have been laid before this Board by the parties and those which have been submitted to the Committee, and by them forwarded to my Lords, but it does not appear necessary to make any special mention of them, as the following remarks are applicable to both.

Outline of proposed scheme.

The scheme contained in the proposed clauses appears to be as follows, viz.:—

1. That the Liverpool Corporation shall purchase the Birkenhead Docks.

2. That, by way of consideration, they shall give to the Birkenhead Dock Trustees and Dock Company bonds chargeable upon the whole of their borough fund, including the town dues. The payment on these bonds, both of the principal and interest, to be deferred for specific periods.

3. That the Corporation shall appoint a Committee for managing the Birkenhead Docks.

4. That the Corporation shall complete the works which the Birkenhead Dock Trustees and the Birkenhead Dock Company are compellable to complete, coming again to Parliament for new powers and with new plans.

5. That separate accounts shall be kept of the receipts and expenditure of the Liverpool Corporation, in respect of the Birkenhead Docks. *Report of Board of Trade, 4 June, 1855.*

6. That the Corporation shall, on being repaid all principal and interest, costs, and expenses incurred by them in respect of the Birkenhead Docks, be bound to transfer them to the Dock Trustees.

7. That the Liverpool Docks Bill, now before Parliament, shall be proceeded with, and not be opposed by Birkenhead.

Recommendations of Shipping Dues Commission as applied to Liverpool.

In considering this scheme, my Lords have kept in view the recommendations of the Shipping Dues Commission, adverted to in their report to the House of Commons, on the Dock and Harbour Bills, of this session, since they deem it of great importance that any arrangement that may be now sanctioned with respect to the Birkenhead Docks, should not conflict with those recommendations, or be so made as to embarrass any measures which Parliament may see fit to adopt, for carrying those recommendations into effect.

As applicable to the port of Liverpool, these recommendations are in substance as follows, that is to say—

1. That a single body of Conservators should be appointed for the whole harbour and its docks, so constituted as fairly to represent all interests concerned in the trade of the harbour.

2. That the Liverpool Dock Trustees should cease to levy dock dues or tonnage rates on vessels which do not use their docks.

3. That, subject to the just rights of the existing creditors, the dues on shipping, now received by the Corporation of Liverpool, should (so far as may be necessary) be applied to harbour purposes, and so far as may not be necessary for that purpose be abolished.

Harbour conservancy and town dues.

It would have been more satisfactory, if the questions of the harbour conservancy and the Liverpool town dues could have been settled previously to, or simultaneously with, the transfer of the Birkenhead Docks; but as there may be some doubt whether, if the present agreement for the sale of the Birkenhead Docks (which is made contingent on the sanction of Parliament) be not confirmed, the various parties interested in those docks can be again brought to concur in a like agreement, my Lords have applied themselves to consider in what mode the existing agreement for the transfer of the Birkenhead Docks may most advantageously be carried into effect, without prejudice to any measures respecting the conservancy and the town dues, which Parliament may hereafter think fit to adopt.

Birkenhead interests with respect to town dues.

With respect to the question of the Liverpool town dues, it is important to observe that those who are interested in the property of the town of Birkenhead and its docks, have hitherto been strongly interested in opposing the continuance of those dues, and their support has accordingly been relied on by other places, having similar interests.

The proposal to place the Birkenhead Docks in the hands of the town of Liverpool will transfer a portion of this support to the side of the

Report of Board of Trade, 4 June, 1855.

upholders of these dues; and if a scheme (which as my Lords are informed is now under consideration) for the purpose of uniting the towns of Liverpool and Birkenhead in one great municipality be proceeded with, and receive the sanction of Parliament, the whole interest of Birkenhead will, instead of opposing, be enlisted in support of the Liverpool town dues.

My Lords desire to call attention to this consideration, not in order to defeat any arrangement for the amalgamation of the respective interests of Birkenhead and Liverpool, but in order to point out how important it is that, in taking any steps towards such an amalgamation, full provision be made for protecting those interests which have no direct means of making themselves heard by the Committee.

Union of Liverpool and Birkenhead Docks under one management.

As regards the more immediate object of the present arrangement, it appears to my Lords that no settlement of the Birkenhead Dock question can be satisfactory which does not provide for placing the docks on both sides of the river under one management, with equality of rates, limited to such an amount as is required to defray all the expenses attendant on the construction and maintenance of the docks.

Purchase of Birkenhead Docks by Liverpool Dock Trustees.

The simple and obvious course for effecting this object would seem to be that the Liverpool Dock Trustees, and not the Liverpool Corporation, should buy up the Birkenhead Docks, complete them, and manage them in conjunction with the Liverpool Docks as one undertaking, provision being made for such a change in the body of the Trustees as should make them fairly represent the interests of all parties.

It is said that the Dock Trustees are not in command of funds which would enable them to make the purchase, and that the only mode by which the two undertakings on the Birkenhead side of the river can be rescued from the present state of insolvency and inaction is that now proposed, viz., That the Liverpool Corporation should step in, and availing themselves of the funds which the town dues (so long as they are continued) place at their disposal, make the purchase, complete the works in the most advantageous manner, and so soon as they are brought into a self-supporting state hand them over to the Liverpool Dock Trustees, upon being repaid the outlay which they will have incurred.

The representatives of the Birkenhead Dock interests refuse, as my Lords are informed, to accept as a security for their purchase-money the bonds of the Liverpool Dock Trustees; and the Liverpool Corporation, although they are ready, as the Mayor of Liverpool has informed my Lords, out of regard for the general interests of the port of Liverpool, and without regard to the separate interests of the Corporation, to lend their aid for effecting an arrangement by which the Birkenhead Dock may be taken out of the hands of the present holders, and placed ultimately under the management of the Liverpool Dock Trustees, yet state that they would not feel justified in using the borough funds for this purpose, unless they could be guaranteed against any borough rate

being rendered necessary in respect of their outlay, in the event of their town dues being taken from them. *Report of Board of Trade, 4 June, 1855.*

Adverting to the measure now promoted by the Liverpool Dock Trustees, under which they propose to raise 3,500,000*l.* for new docks, and to the present income of the Dock Trustees, and the state of their existing debt, and considering also the influence which the proposed amalgamations must (as above mentioned) have on the views hitherto entertained by those interested in Birkenhead,—my Lords find it difficult to believe that there can be any such inability on the part of the Liverpool Dock Trustees, as is suggested by the promoters of the proposed arrangement, at once to raise the funds necessary for the purpose of enabling them to make the purchase of the Birkenhead Docks, and to undertake their completion. Supposing, however, this to be so, and assuming for the moment that the Liverpool town dues may with propriety be made available for the purpose of facilitating the proposed arrangement, it appears to my Lords that the scheme proposed in the clauses that have been submitted to the Committee, on the part of the Liverpool Corporation, is not the best that can be adopted for securing the object in view, and that it is open to some serious objections. Objections to proposed scheme.

In the first place, there is no security that the proposed transfer to the Liverpool Dock Trustees will ever take effect. No security for completion of transfer.

It has been stated by the Mayor of Liverpool to be the intention of the Liverpool Corporation, that the Birkenhead Docks, when purchased, shall be placed at once under the management of the Liverpool Dock Trustees, and that the rates in the two sets of docks shall be equalised.

There is, however, nothing in the clauses with respect to equalisation of rates; and as regards management, the only provision is, that it shall be undertaken by a Committee appointed by the Liverpool Corporation. Nor is there anything to compel the Liverpool Dock Trustees to accept at any time a final transfer of the undertaking. On the other hand, the provisions for issuing the bonds, which are to be the consideration for the purchase by the Corporation, imply that those bonds are to be a charge on the Liverpool borough fund, including the town dues, until the transfer to the Liverpool Dock Trustees is effected.

If the Liverpool Docks may be carried on as a rival scheme, and no restriction is placed on their improvident extension in a northerly direction, it is by no means clear that the period will ever arrive at which it will be the interest of the Liverpool Dock Trustees to assume the purchase of the Birkenhead Docks on the terms proposed; and the Liverpool Corporation may thus be indefinitely confirmed both in the possession and management of the Birkenhead Docks, and in the possession of their town dues.

And even supposing the time to arrive when the Liverpool Dock Trustees are in a condition to assume the purchase, the funds required by them for this purpose would have to be raised on the credit of the dock dues; and with what propriety can the dock dues be burdened to When completed, the Corporation are to be reimbursed for what they

Report of Board of Trade, 4 June, 1855.

repay to the Liverpool Corporation money which they have advanced, not out of its ordinary municipal revenue, but to a large extent, at least, out of the town dues upon trade and shipping?

have expended out of the town dues in the purchase.

My Lords are, however, impressed with the great importance of securing the completion of the Birkenhead Docks, and placing them under one management with the Liverpool Docks; and they think that if the Liverpool Corporation lend the aid of their credit for this purpose, without proposing to derive any pecuniary benefit from the transaction,

Propriety of indemnifying the Corporation against actual loss.

they may reasonably require that so long as they are burdened with the debt incurred for this purpose the town dues shall not be taken from them, without provisions being made for relieving them from the debt.

It appears to my Lords that the proposed purchase and transfer of the docks may be accomplished by clauses embodying a scheme to the following effect:

Scheme suggested.

1. Confirm the purchase made by the Liverpool Corporation.

2. Place the docks at once under the management of the Liverpool Dock Trustees.

3. Complete the works at present authorised under the respective Acts relating to the Birkenhead Docks, within one year (or other limited period) from the end of next session, unless otherwise provided by Parliament, the Liverpool Corporation raising the necessary funds upon Corporation bonds, each of such bonds to bear a distinct notice of the Act under the authority of which it is issued.

4. Provide for equality of rates in the Birkenhead and Liverpool Docks.

5. Keep a separate account of the rates in the Birkenhead Docks, and pay the amount, after deducting working expenses, to the Liverpool Corporation, until provision is made for paying the interest of the bonds given by the Corporation, in satisfaction of the purchase money of the docks.

6. Declare specifically, that neither the Act, nor the bonds issued under its authority, shall prevent Parliament dealing with the town dues, provided that in any such dealing, provision be made for keeping down so much of the interest thereafter accruing on the Corporation bonds in question as the net income of the docks shall be insufficient to pay; and for otherwise indemnifying the Corporation against any borough rate which they may be obliged to raise, or against any loss which their borough fund, exclusive of the town dues, may suffer in consequence of the purchase of the Birkenhead Docks.

7. So soon as provision has been made for relieving the Liverpool Corporation from the principal and interest of the debt incurred in the purchase, and for indemnifying them against loss, the docks to be transferred to the Dock Trustees.

The above provisions may, if they meet the views of the Committee, and are assented to by the parties, be inserted in the Birkenhead and Liverpool Docks Bill.

In order to complete the arrangement, my Lords would suggest that the following provisions should be introduced into the Bill promoted by the Liverpool Dock Trustees: *Report of Board of Trade, 4 June, 1855.*

Require the Liverpool Dock Trustees to come to Parliament next year with a Bill, having the following objects,—

Objects of future legislation.

1. The reconstitution of the Dock Trustees, in such a manner as to represent not only Liverpool and Birkenhead, but all parties concerned in the trade of the Mersey.

2. The revision of the limits of the harbour.

3. The better management and conservancy of the harbour.

4. The transfer of the Birkenhead Docks to the new body of Trustees, to be managed by them jointly with the Liverpool Docks as one undertaking, such transfer to be subject to the provision above mentioned for paying the income from the Birkenhead Docks to the Liverpool Corporation, until they are indemnified from loss in consequence of their proposed purchase.

5. The completion by the new trustees of so much of the Birkenhead Docks as shall be then unfinished, either according to the present plans, or according to such improved plans as shall be approved by Parliament.

In order to compel the Liverpool Dock Trustees to abide by the above terms, any powers given to them by the Bill this session may be limited so as to render it impossible for them to make the proposed outlay for the north docks, without taking such steps as Parliament may think fit to impose for the completion of the Birkenhead Docks.

In addition, my Lords would suggest for the consideration of the Committee whether it would not be desirable, in pursuance of the recommendation of the Shipping Dues Commission, and with a view to the interests of traders who resort to the Mersey without using either the Liverpool or the Birkenhead Docks, to take the present opportunity to exempt vessels not using the Liverpool Docks from all dues levied by the Liverpool Dock Trustees, except such dues as are applied for harbour purposes.

I have the honour to be, Sir,

Your obedient servant,

(Signed) JAMES BOOTH.

Mr. Serjeant Wrangham and Mr. Hope Scott were heard in reference to the suggestions made by the Board of Trade.

Mr. Heron, on behalf of the Corporation of Manchester, claimed to be heard in reference to such clauses of the Bill as referred to the Liverpool Town Dues.

Mr. Serjeant Wrangham was heard against the application.

The Committee decided that the Corporation of Manchester had no *locus standi* before them.

The counsel were informed that the Committee were desirous of seeing

EVIDENCE IN THE HOUSE OF COMMONS,

SESSION, 1856.

BIRKENHEAD DOCKS BILL.

IN THE HOUSE OF COMMONS.

Monday, 5th May, 1856.

SIR WILLIAM CLAY, BART., IN THE CHAIR.

The Petition for the Bill was read.

Mr. Hope Scott, Mr. Merewether, Mr. Burke, and Mr. Loch, appeared as counsel, and Messrs. Pritt and and Co. as agents, for the Bill.

Mr. Serjeant Wrangham, Mr. Calvert, and Mr. J. J. Johnson, appeared as counsel, and Mr. Martin as agent, on the petition of the Great Western Railway Company, against the Bill.

Mr. Denison and Mr. Webster appeared as counsel, and Mr. Martin as agent, on the petition of the Birkenhead, Lancashire, and Cheshire Junction Railway Company, against the Bill.

Petitions from the following—The Birkenhead Dock Trustees, Messrs. Bircham as agents; the Birkenhead Improvement Commissioners, Messrs. M'Dougall and Newall as agents; the Wallasey Local Board of Health, Mr. Martin as agent; the Owners of Land in Poulton-cum-Seacombe, Mr. Martin as agent; the St. Helen's Canal and Railway Company, Messrs. Dyson and Co. as agents; Directors of Manchester Commercial Association, Mr. Wyatt as agent; the Mayor, Aldermen, and Burgesses of Manchester, Mr. Wyatt as agent; the Birkenhead Dock Company, Mr. Stephens as agent—were appeared on against the Bill.

Mr. Hope Scott was heard to open the case on behalf of the promoters of the Bill.

Tuesday, 6th May, 1856.

SIR WILLIAM CLAY IN THE CHAIR.

The agents on behalf of the Birkenhead Improvement Commissioners, the Birkenhead Dock Trustees, the Birkenhead Dock Company, the St. Helen's Canal and Railway Company, the Wallasey Board of Health, and the frontagers on the Great Float reserved their opposition to the Bill on clauses.

E. H. Bramah, 6 May, 1856.

Edward Henry Bramah, examined by Mr. Loch.

I was law clerk to the Birkenhead Dock Trustees till the estate was purchased by the Corporation of Liverpool; I also acted as their secretary; I was appointed, in September, 1852. The situation I filled has put me in possession of the history of all the transactions relative to the Birkenhead Docks. The first application to Parliament for power to construct basins and docks there was in the Session of 1844; the parties took power to raise, and did raise, 400,000*l.* The site proposed for the works at Birkenhead was what was called Wallasey Pool; it is best represented by that map there in its natural state, but it is not represented anywhere precisely on the wall as it was before any dock works were constructed. There is nothing here which shows Wallasey Pool as originally, but the lower map is the nearest to its original condition; it was an open pool, opening into the Mersey, with the tide ebbing and flowing. The general scope of the plan was the construction of river walls between the two ferries called Woodside Ferry and Seacombe Ferry, with an entrance of 300 or 350 feet from the river, which was to be the entrance to what was intended to be a low-water basin, and from that low-water basin there were entrances in a dam to be constructed across the mouth of the pool into the pool itself, and that pool was to be excavated at the back of that dam to the extent of about 12 acres; that was the original plan; and also with an entrance into a dock which is now called the Egerton Dock, from that fork or arm of the basin, as shown on the plan, where it is marked yellow; that was the original plan. It consisted of two works, first to dam up the water in the great natural inlet, and make it a great float; and secondly, constructing a basin outside, into which the tide would flow and ebb without any gates to it. The width at the entrance of the basin was upwards of 300 feet; and its area 37 acres. By the Act of 1844 it was only intended to excavate about 12 acres of the pool for dock purposes at that period; so that the whole space of the great float would not have been applicable to the taking in of vessels; it was left in its natural condition under the Act of 1844. I have always understood that the principal

Birkenhead works in 1844.

object of the great float was to form a sluicing power for the purpose of keeping clear the outer basin, the sluices themselves being in the dam at the mouth there, and also at the entrance to what is now marked as the Egerton Lock. It was also thought at that time that the land on both sides of the float being remarkably convenient for mercantile purposes, dock-making, and so forth, the great float itself might form a highway to the various docks to be constructed on the side of it. The great low-water basin was intended to give very superior accommodation; that is to say, it was contemplated that by excavating it to a proper depth, they would have a sufficient quantity of water in it at all times to admit vessels entering the river Mersey with flood tide: I think the project was, that whenever a ship could enter the Mersey across the bar at the mouth on a flood tide, by the time she arrived at the entrance of the great low-water basin she would find water enough there to take her in. The great low-water basin was to be excavated so as to ensure never less than 12 feet of water at low-water spring tides. I think the depth in figures was something like 20 feet 9 inches below the Old Dock sill. There was to be an opening between the great float and the low-water basin by means of that small dock, now called the Egerton Dock. There was a small lock there, which I believe was intended to be a small-craft entrance, so as to relieve the great gate from that sort of coasting and river craft which was thought to be desirous of receiving accommodation in the docks. There was no other entrance; the Morpeth Dock was not then contemplated. Under the first Act the Crown granted to the Commissioners all the Crown rights in the soil of the Wallasey Pool fronting the river, and to a certain limit westward, that was required for the purposes of making those works as designed. It was a free grant. The Commissioners, in the following year, 1845, went to Parliament for the purpose of completing the excavation of the great float, and they got power to raise an additional capital, amounting to 600,000*l.*, and the greatest portion of that capital was to be applied to walling and deepening the float, which extends to very nearly two miles from the entrances you see on the plan. The Crown then made a further free grant of all the remaining portions of Wallasey Pool, which had not been granted by the previous grant of 1844. No trusts were annexed to the grant at that period, but subsequently there was another grant made, which was in consequence of the state of things produced by the walling of the float. The walls, as designed and authorised by Parliament, did not follow the exact line of the water in the float, but they were made generaly rectangular like other dock lines, and the result of that was, that in many parts a great deal of land was reclaimed behind the line of wall and in front of the original line of the land abutting on the water, and that reclaimed land was granted by the Crown to the Trustees of the Birkenhead Docks as Trustees for the frontagers who had built their walls, or paid for their walls rather, and who were entitled to all the land reclaimed by the construction of the

E. H. Bramah, 6 May, 1856.

Objects of great float and low-water basin.

Grant by the Crown under Act of 1844.

E. H. Bramah, 6 May, 1856.

wall. These arrangements did not take place till 1850. The walls were not built, although the Commissioners in 1845 got power to build the walls, and to expend the money upon them, and the landowners upon the float were authorised to repay them the expense of those walls, and to take possession of them themselves.

Dock Company.

There was another Act of Parliament obtained in 1845, the Dock Company's Act, incorporating and empowering the Company, in the usual way, to build wharfs, warehouses, and docks on a very large tract of land on the south side, the whole of which they occupied as lessees for a very long term of years under the Corporation of Liverpool. Many of those who had subscribed their money for the construction of the docks, under the Act of 1844, also embarked very largely in the speculation of that Company. The Birkenhead Dock Commissioners or Trustees did not propose to make a profit or dividend out of the capital subscribed; they were limited to the payment of 5 per cent. upon the money raised, and any surplus was to be appropriated to the paying off the principal borrowed. The Birkenhead Dock Company was a Joint-Stock Company; one part of its scheme was to construct docks within their own land; not to use the float for a dock except for subsidiary purposes, but the main scheme was the construction of docks inside their own walls, to be entered by gates from the float. The Trustees had raised the sum of 400,000*l.* under the Act of 1844, but of the 600,000*l.* which they took the power to raise in 1845, they succeeded in raising only 26,000*l.* In the course of carrying out the work authorised by the Act of 1844, it was thought desirable to make a temporary communication with the great float from what is now marked as the Woodside Basin, in order to give full access to certain parties who had located themselves as manufacturers, and to copper rolling-mills on the margin of the float, on the north side; and to enable the Dock Trustees to do that, they had a temporary canal, or cut, on what is now the site of the Morpeth Dock, so as just to give an access for small river craft to those parties during the progress of the works authorised by the Act of 1844. And in 1846 it was suggested that this cut or canal should be walled and made into a dock, and it was accordingly made into a dock; and in 1847 the Trustees went to Parliament, and obtained Parliamentary sanction for the opening of that dock—I mean the Morpeth Dock. It was called the Morpeth Dock, and it was opened by Lord Morpeth, now the Earl of Carlisle. They constructed it in the first instance without direct Parliamentary sanction, and they obtained the sanction of Parliament afterwards. The result of that was to cut off the communication by land between the south reserve and the contiguous town of Birkenhead; by the original design, the land called the South Reserve was an integral part of the main land altogether; but by the construction of that dock it became an island. The Trustees took power to raise 400,000*l.* under that Act of 1847. The Act of 1848 made a change in the constitution of the dock authorities; instead of being Commissioners,

Construction of Morpeth Dock.

they were created a Trust, under the name of the Birkenhead Dock Trust. But there was no alteration of plans contemplated in 1848; only the constitution of the Trust was changed. A certain number of the bondholders were made Trustees. The Act was obtained in a great degree at the instigation of bondholders, who were not represented; and six out of thirteen of the Trustees were bondholders. Power was taken to raise 50,000*l.* by preference bonds to construct a temporary dam across the mouth of the Wallasey Pool, for the purpose of enclosing the float temporarily, rendering it in some degree available for trade; not with the view, however, to the substitution of it for the original plan, but merely to make it productive. The Trustees raised a portion of that preference capital, and the contractors took the rest of their bonds in payment of the works. *E. H. Branch*, 6 May, 1856.

The Birkenhead Dock Company took advantage of the provisions of the Act of 1847 to build their walls as they at present exist all along the south side, with the exception of the public wharf; the Birkenhead Railway Company likewise, at the extreme end, built their walls there. Some other landowners took the same course. The carrying out the Act of 1844 would have reclaimed a very large surface of land behind the inner walls, which is represented on the plan as the north and south reserves, containing between 90 and 100 acres. The Crown parted with its interest in the south reserve in the year 1850, by an arrangement with the Dock Trustees, retaining the property in the north reserve; it made a free grant of the south reserve to the Dock Trustees, upon the condition that any monies that might be raised by sale, or lease, or mortgage of it, all of which they had power to do, should be appropriated to the construction of the works. The Act of 1850 confirmed that arrangement, and authorised the grant of the south reserve amongst other things. The total sum which the Commissioners or Trustees had power to raise was, by the first Act, 400,000*l.*; by the second Act, in 1845, 600,000*l.*; and in 1847, 400,000*l.*; that would make 1,400,000*l.*; and by the Act of 1848, 50,000*l.* They have only actually raised out of all that, 476,000*l.* In October, 1852, and in June, 1853, two contracts were made to complete the whole of the works as designed by Mr. Rendel, with some slight alteration. The Trustees made use of the south reserve, which Mr. Brassey agreed to take as money, or in part payment of the contract sum; also a sum of 22,000*l.* to be repaid by the Crown; and the contractors consented to take the bonds of the Trust for the balance. The entire amount of the two contracts was 608,000*l.*; that, therefore, is the exact sum that Mr. Rendel's plans were to cost. Grant of south reserve.

In 1855 the Birkenhead Dock Trustees were petitioners before Parliament against the Bill introduced by the Liverpool Dock Committee for the extension of their Dock Estate towards the north; we were heard upon petition, and witnesses were examined; and in the course of that inquiry, Mr. Labouchere, the chairman of that Committee, expressed a very strong opinion that it would be exceedingly desirable Union of dock estates suggested.

R. H. Dranal, 6 May, 1856.

for the mercantile interests of the Mersey that this question should be settled, and that the Birkenhead Estate should become part and parcel of the Liverpool Dock Estate.

In 1854, Mr. Brassey and his co-contractors were owners of the south reserve. That is to say, they were *primâ facie* owners; and, of course, there is no doubt I believe at all that Mr. Brassey looked to making his money out of that south reserve, by the intervention of railway companies who had an interest in bringing the traffic there; and in the Session of 1854 he brought in a Bill in conjunction with those railway companies, the Shrewsbury and Chester Railway Company, and the Shrewsbury and Birmingham—both of which are now the property of the Great Western—and the Great Western is named, too, that they should have power to take the south reserve; with that Act of Parliament the Trustees had nothing to do—they did not attend Parliament upon it. The Act was to enable the railway companies to agree with the contractors for that land. The contractors ceased to have any power over that land in 1855. Under their contract, so long as they were in existence, and in course of proceeding, the contractors were masters of that south reserve; and if they had completed their works, that south reserve would have been conveyed to them in the ordinary form, in fee simple, and then they would have been able to sell it, if they pleased, to the railway companies. They had no interest in that land except as payment for the works they had to do, and being absolved from the works the land went with the contract altogether. The contractors had no legal estate in the land. Under their contract they could not have let it without the consent of the Trustees; they had only an equitable title.

Suggestions of Committee of 1855.

In consequence of Mr. Labouchere's suggestion the Corporation of Liverpool undertook to purchase this property. In the first instance, Mr. Labouchere's suggestion was that the Birkenhead Dock Estate should become part of the Liverpool Dock Estate. That was the original intention; but the truth was, that the bondholders declared plainly and positively that they would not take the security of the Liverpool Dock Trust. The Corporation stepped in as the only person that could give a security satisfactory to the vendors. The Board of Trade made several recommendations (*ante*, p. 232); some were adopted and some were rejected by the Committee, and the Bill was subsequently passed. The 19th clause is, "And whereas it is expedient that the Birkenhead Docks should, with as little delay as possible, be constructed and completed in such manner as may render them most available for the commercial purposes of the port of Liverpool in connexion with the Liverpool Docks; and that the same rates, dues, and charges should be levied in respect of the Birkenhead Docks as are now or may hereafter be levied in respect of the Liverpool Docks; and that all the said docks should be placed permanently under the same control and management, and be consolidated with and become part of the existing estate of the Liverpool Docks. Be it therefore enacted that the Liverpool Docks shall, and they are hereby required, either alone

or conjointly with the Trustees of the Liverpool Docks, to prosecute a Bill in Parliament in the next session, for obtaining the requisite powers for accomplishing the several objects aforesaid." The present Bill is introduced in conformity with that clause. Meetings took place of the Dock Committee and the Council; there was a reference to Mr. Wightman and Mr. Hartley, for the purpose of ascertaining what portion of the Birkenhead Dock Estate was actually open for the accommodation of the trade, in order that that part of it might be put at once under the management of the Liverpool Dock Committee, in accordance with the Act of Parliament of 1855, by which it has been so placed, and still continues in their management. The question of the dock accommodation was referred to Mr. Hartley only. The Council called in to their assistance some gentlemen connected with the trade of the port—Mr. M'Ivor, Mr. John Laird, shipbuilder, and Mr. Hamilton. Mr. M'Ivor represented the American Mail packets that run from Liverpool to Halifax and New York—Cunard's line. Mr. Hamilton is a partner of Mr. Brown's, the great firm of merchants, and agents for the Collins's line of American steamers, amongst other things. Mr. John Laird is one of the first iron shipbuilders we have. These were called in by the Dock Committee of Liverpool, for the purpose of having submitted to them Mr. Hartley's plans, and report with reference to the works that should be constructed at Birkenhead by the Corporation. They saw the plans, and suggested some alterations, which were adopted. *E. H. Branch, 6 May, 1856.*

The only railway that actually terminates at Birkenhead is the Cheshire Junction Railway. The general passenger station of the railway is at the ferry on the river, called Monks Ferry. I was speaking with reference to the Dock Estate more particularly; but the station does not appear upon any of those plans; it is further up the river than where we are now; it is the next ferry to Woodside, a very short distance indeed. The railway came originally to Monks Ferry, and no further; under the powers of a subsequent Act, the line was extended to the docks. The Great Western Railway Company get to Birkenhead as the present owners of the lines formerly possessed by the Shrewsbury and Chester and the Shrewsbury and Birmingham Railway Companies; those companies had running powers over the Cheshire Junction lines, and those running powers are of course now vested in the Great Western, as the purchasers of all their rights and interests. But they are not in lawful possession at this moment, according to my view, or the view of the late Trustees of the Birkenhead Docks, of the south reserve, under any rights that they have obtained by the purchase of the Shrewsbury and Chester Railway Company's estates, but by a special agreement made subsequently, which agreement was intended, of course, not to affect the rights of either party, whatever rights are existing between them. In 1850 the Shrewsbury and Chester Railway Company entered into some negotiations with the Trustees of the Birkenhead Docks, for the purpose of getting station land at Birkenhead, Railway at Birkenhead.

E. H. Bramah, 6 May, 1856.

South reserve and bridge over Morpeth Dock.

and they were preparing then to go to Parliament for the purpose of getting Parliamentary authority to take land, or to purchase land at Birkenhead, for a particular purpose. Now I am speaking of the Shrewsbury and Chester; they did obtain an Act of Parliament, which is called the Shrewsbury and Chester Railway Act, Birkenhead Station, 1851, by which, amongst other things, they were authorised to take this land on the south reserve, that is, some land on the south reserve; and by their deposited plan they set out the south reserve, and scheduled it as land to be taken. After that Bill passed, in December, 1851, the engineer of the railway company and the engineer of the Dock Trust, that is to say, in the one case Mr. Robertson, and in the other Mr. Abernethy, met with the sanction of their respective boards; and they agreed to a memorandum of agreement under which the occupation of the south reserve was given to the Shrewsbury and Chester Railway Company. The Birkenhead Dock Trustees of that day agreed to put a swing bridge across the passage, between the Morpeth and Egerton Docks there; a swing iron bridge which was approved of by Mr. Abernethy, I believe, as the best sort of bridge for the purpose. The Birkenhead Trustees reserved the full power respecting this bridge, under the control of the harbour master. There was no contract to maintain the bridge. It was never completed. It was a subject of very great dispute. The Trustees are not obliged to keep it up, further than while the present arrangement with the Trustees and the Great Western continues; the bridge was put up by Mr. Brunel, and it is working at this moment. It is subject to the same agreement as the holding of the land. That question of the bridge was brought before the Court of Chancery in the year 1852, in a proceeding by the Trustees against the Shrewsbury and Chester Railway Company, whereby the Trustees sought to obtain an injunction to restrain the Shrewsbury Company from taking possession of that bridge; they had thrown it across in an unsafe condition one night, and it was objected to by the Trustees, which caused a great row, and the Trustees thought right to try the question of the bridge by going to the Court of Chancery for an injunction. The Master of the Rolls granted an injunction, which has never been disturbed; and it was taken down by the Trustees. The arrangement with the Shrewsbury and Chester Railway Company had been entered into by the Trustees of the Docks, who were displaced at the time of Baron Goldsmid and his friends being elected. The new Trustees differed as to the policy of the arrangement which had been made with the Shrewsbury and Chester Railway Company with regard to the lease of the south reserve. The Shrewsbury and Chester Railway Company acted in a way which gave the Trustees an opportunity of going to the Court of Chancery to get possession of the bridge; the consequence was, they took the bridge away, and of course, as a consequence, rendered the station on the south reserve nugatory; there was no bridge to it. The first agreement was in December, 1851; at that time it was contem-

plated to substitute a half-tide basin for the low-water basin. In August, 1852, another agreement was made with the Shrewsbury and Chester Railway Company, under which the Trustees of that time, that is to say, the half-tide basin Trustees of that day, agreed to grant a lease to the Shrewsbury and Chester Railway Company of a certain portion of that reserve. Here is a copy, furnished to me by a gentleman who has the original; but the original shall be produced and handed in. It was for 999 years, with a covenant for renewal, which was a curious thing at the end of 999 years. It was executed on the very day on which the old body of Trustees went out of office; the 1st of August, the day of election. When the new Trustees came into possession there was no access to the land, because there was no bridge; and as soon as the bridge was up, which practically would give the Company an access, it was taken away by the authority of the Court of Chancery. The bridge was lying on the dock quays for a long time, and at last a judgment creditor of the Trust sent a sheriff's officer there, and took it in execution. It was bought by a gentleman interested in railways, and we allowed it to remain on the quays; but it was taken away and sold for about 450*l.* In May, 1855, by arrangement with Mr. Brunel and the Great Western, the bridge was put on the same spot, and served the same purpose. The agreement under which the Company has access to, and occupy the land, is dated May, 1855. Some portion of the land is comprised in the old agreement of 1852, because the shed is, to some extent, a permanent work. The Great Western have a longer frontagé at Morpeth Dock than the Shrewsbury and Chester had; but all the land here which is coloured yellow is in abeyance. The agreement of 1855 is merely for occupation; it is between Brassey and M'Cormick and the Great Western Company, and terminable at 18 months' notice. By clause 10, "it is expressly understood between parties, that neither this agreement, nor the lease to be executed in pursuance hereof," that is, provided the lease be ever executed in pursuance hereof, "is in any manner to be taken as affecting or prejudicing any question whatever as to the validity of an agreement, or alleged agreement between the Trustees and the Shrewsbury and Chester Railway Company, of 12th of August, 1852; but both parties shall, as regards their rights (if any) under such last-mentioned agreement, remain and be in the same position, to all intents and purposes, as if this agreement had not been entered into."

E. H. Bramah, 6 May, 1856.

Cross-examined by Mr. Webster. *Cross-examination.*

The book of plans I have produced contains the original plan of November, 1843; in fact, copies of all the plans from 1843 to 1854 inclusive. In speaking of the early history of the works, the plan referred to was the first plan. At that time it was part of the original design, as laid out by Mr. Rendel, that this low-water basin should be a place to which the Irish Mail Packets and all the coasting steam-packets of

E. H. Bramah, 6 May, 1856.

the port could resort; I have seen it so stated in Mr. Rendel's report of October, 1843. It was a part also of that same project that the railway which then came no further than Grange-lane, should be extended to the docks; so that the passenger traffic of the Mersey could be transferred directly, by means of the great low-water basin, on to the railway, and so proceed to London and to the south. I do not remember seeing that it was part of the scheme that a large portion of the ferry traffic of the Mersey should use the low-water basin and proceed to the interior; but I can state that the low-water basin was intended for the accommodation of every description of traffic going to and from the railways. I concur in the statement contained in the report of Mr. Rendel (see Appendix), that "from St. George's Pier, Liverpool, to the present Monksferry Station Pier, the distance is 5200 feet, whilst from the former pier to the entrance of the great intended basin of the Birkenhead Docks the distance is only 3400 feet, and to the great landing-place for steamers of all kinds the distance is 1500 feet further, or together less by 300 feet than to the Monksferry Station." Also, "then as to accommodation the comparison is still more favourable for the embarkation and disembarkation of passengers and goods at Bridgend." Bridgend is one of the stations now of the railway company; it is at the corner of the Morpeth and Egerton Dock; it is only a shed. There is the Monksferry station down the tunnel, the goods station, and this shed. Also, "the embarkation and disembarkation of passengers and goods at Bridgend would be in a sheltered basin furnishing accommodation of the most complete kind, adapted not only to the ferry steamers, but accessible at all times to the Scotch, Irish, and other coasting steamers which frequent the port, affording all these, as well as the railway boats, the facility of embarking and disembarking their passengers and goods at a landing-place with the railway laid along it. In the plan it will be seen that this station is arranged to admit of a most eligible site for an hotel, having all its foundations provided in the execution of the station works, and placed so as to be in the most public situation for the docks and general road traffic, and so as to overlook the river and the great basin of the Dock Commissioners' works." I remember very well reading those passages, especially about the comparison of the distance between the ferries. I know the south reserve at that time, or the land to be reclaimed there, was thought to be a very eligible position for a station, that it was the best that could be hit upon. At the time referred to, in October, 1843, it was intended and contemplated that this low-water basin would be the great landing-place for passengers, for both the ocean passengers and the local passengers passing to the town. In 1843, the whole of the land on the south of Wallasey was, I believe, the property of the Corporation. I have not seen a Parliamentary paper, a return by order of the House of Commons, dated the 4th of April, 1848, setting forth the correspondence which had taken place between the Commissioners of Woods and Mr.

Low-water basin designed for steamers.

Hartley as to the value of the Crown rights. I have not heard that Messrs. Jessie Hartley and Son valued the Crown rights in Wallasey Pool at as much as 798,000*l.* When I spoke of a free grant on the part of the Crown, I meant a grant without consideration in money. *E. H. Bramah*, 6 May, 1856.

The works first authorised consisted of this low-water basin and a dam penning up the water in the pool, and the Egerton Dock. The Woodside Basin was, I believe, imposed upon the projectors by the opponents in their passage through Parliament, and became ultimately a part of the works. At that time, both the Corporation and the Dock Committee were opponents, and the contest lasted many days in the House of Commons and the House of Lords in 1844. The Woodside Basin, as I understand it, was in consequence of the petition of certain persons who called themselves representatives of the coasting trade, who seemed to think that some interference with their usual anchoring ground would take place in consequence of those works, and that something by way of substitute should be afforded, and that Woodside Basin was to be made by the Dock Trustees of a certain depth, and the Parliamentary plan deposited shows the line of what was called the beaching ground; that shows the addition to the plan. The original plan of Mr. Rendel was for a six-acre basin, and a sloping embankment next the Mersey. That basin was made much larger and deeper, and the embankment was converted into a vertical wall and a slip made for the landing of goods for the people of Birkenhead. The Woodside Ferry Pier was raised to the level of the south reserve wall, and the Woodside Basin made a very perfect work. It is expressly excepted by Act of Parliament from rates; it is the best ferry in the Mersey. The extra works imposed by reason of the opposition amounted to somewhere about 100,000*l.*, according to a statement I have seen of Mr. Rendel to that effect. The Act of 1845, called the Walling Act, was to raise 600,000*l.* for the completion of the scheme sanctioned in 1844; the evidence of 1844 tended to show that that would be the completion of it. My impression is that Mr. Rendel spoke of the float, more particularly as a road to the docks on the side. He seems to me always to have been very particular down to a late period in pointing out the great facilities of making docks in the land abutting on either side of that pool. I do not think its use as a dock was so clearly defined at the time. Mr. Rendel's Report of October, 1843, says, "enormously large as this dock may appear for commercial purposes." Under the Act of 1844 there were no rates at all upon goods; nothing but a rate upon the tonnage of the ship, which I believe was the case at Liverpool originally. The works sanctioned by the Act of 1844, and for which the Crown made a free grant of land, were the low-water basin, the embankment penning up the water in the float, the Egerton Dock, and the Woodside Basin. The only rates given to the Trustees in respect of those works were rates upon vessels entering the low-water basin. By sections 153 and 160, all vessels having entered the low-water basin

Works under Act of 1844.

Woodside Basin.

Act of 1845.

Rates under Act of 1844.

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were to be entitled to go free into the upper float. There were exceptions in favour of the Liverpool Tug Company, and what are called river craft generally were exempt; any goods brought into the place were entirely free. Under the Act of 1844 there were public quays on the side of the low-water basin; also, according to the arrangement with the Crown in 1844, there was a public quay from the railway station at Bridgend down to the low-water basin; that which is now called Egerton Dock was then called the Bridgend Dock. Between the Bridgend station, which is marked on the plan as the passenger railway station, and the Bridgend Dock, now called the Egerton Dock, and the low-water basin, the quays and wharfs were open, and the public would have the right to land and load their goods there or to go to the passenger station, now called the Bridgend station of the railway, provided the tonnage rates were paid upon all the vessels that brought them in. In 1845, vessels coming into the low-water basin would have discharged their goods upon the free quay at the Egerton or Bridgend Dock, and transferred them on to the railway at Bridgend station without any charge upon those goods. I have heard it stated that the absence of any charge upon goods was one of the great motives for the support of this undertaking by Manchester and the manufacturing districts generally. The Manchester people, and other people interested in the trade, came to oppose the Bill for rating in 1848, upon the ground that it injured their interests. The Cheshire Junction Railway was a railway to Manchester, called originally the Birkenhead and Manchester Railway. I recollect seeing the Report of the Board of Trade upon it in 1844; that it was intended for an independent communication to Manchester, but it never has been carried there; the Company has broken that part of the contract. It was at that time represented that there would be no rates at all on goods at Birkenhead; they never contemplated any such thing. There is now a railway from Manchester to Birkenhead, carrying at the same rates from Birkenhead, by the railway between Birkenhead and Manchester, as by the Liverpool and Manchester from Liverpool.

Public quays.

Bridge across the Morpeth Dock.

Between the Bridgend station of the railway, and the low-water basin, and the Egerton Dock, there was only a public quay. The Morpeth Dock obstructed the passage to the low-water basin because it interposed that water space between it and the south reserve. The Morpeth Dock Act of 1847 contained the following clause:—"Be it enacted, and it shall be lawful for the Dock Commissioners, and they are hereby required, as soon as conveniently may be after the passing of this Act, to construct and maintain, to the satisfaction of the Commissioners of her Majesty's Woods, Forests, Land Revenues, Works, and Buildings, and according to designs and elevations to be approved of by them upon the sites marked out upon the plans hereinbefore referred to, two good and sufficient bridges of communication, to be constructed of timber and iron, for the free transit of all foot-passengers, horses, carts, carriages,

and other traffic, one of such bridges to cross the western entrance of the said dock, by this Act authorised to be made, and to be maintained as a permanent thoroughfare, and the other of such bridges to cross the eastern entrance into the said new dock." Whether the Trustees intended that bridge to be the carrying out this clause or not, I do not know, but the reason why I mentioned the fact of this question having been before the Court of Chancery, was simply because this clause was then argued as to how far there was or was not a liability upon the Birkenhead Dock Trustees to keep a bridge in connexion with the south reserve. Before the Morpeth Dock was made, the communication between the railway station and the low-water basin was a public quay; the interposition of this Morpeth Dock cut off the access from such railway station to the low-water basin; the construction and maintenance of a bridge at the west end of the kind described, to be kept as a permanent thoroughfare, would restore that communication from the railway station to the low-water basin, so far as passengers and all the ordinary traffic of the road were concerned, but I do not think the words "carts, carriages, and other traffic," mean railway carriages or lines of railway to be made across it. That bridge is used as a railway bridge by permission. By the Act of 1850, the Crown became possessed of the north reserve, freed from the restrictions which had been imposed upon it for the benefit of the public, except as provided by the Act of 1850 itself; that Act provides, by section 16, that the quay next the tidal basin should be kept for the purpose of working vessels into the docks; it also provides for a road to Seacombe, and for laying rails upon the temporary embankment; and I suppose it was intended to provide, by section 17, for connecting such rails with the Cheshire Junction Railway, but I do not think the clause does it; I have tried to understand it very often, but I cannot make it out to this day. Section 18 provides that the railway should be made over the temporary dam, and should "form a junction between all the several lands hereinbefore mentioned, and the said Birkenhead, Lancashire, and Cheshire Junction Railway on the south side of the said pool;" that is perfectly clear beyond all question; but as the Act now stands there is no Parliamentary authority, or no obligation upon the Birkenhead Dock Trustees, to lay a railway across the embankment; it is, however, no more the interest of the Birkenhead Dock Trustees to keep off the rails from those quays than it is for the Company themselves not to lay them down. On all occasions it has been represented, in contrasting Birkenhead and Liverpool, that the access to the docks at Birkenhead and to the low-water basin would be by railways coming down to the water side, instead of the traffic having to be transferred by carts and carriages, as at Liverpool; that is one of the great features. All those quays, so far as merchandise and goods of every description were concerned, were free quays; that is to say, they were to be open to the public to moor and unmoor vessels, and to load and unload goods, free; the quays were to be free to traffic of every de-

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Access to low-water basin interrupted.

Act of 1850.

Railways to water side.

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scription coming from the low-water basin to the railway, provided always the ship pays the rate; they were also to be free for traffic going from the railway to the low-water basin, in the same way.

Cross-examination.

Cross-examined by Mr. Johnson.

I have been the officer of the Trustees from September, 1852; I am secretary, as well as clerk. The custody of the corporate seal of the Trust was divided between me and the chairman; he kept one key of the box and I kept the other, so that neither could get at it without the other. The memorandum of agreement of 1851 was not under the common seal of the Trustees; it was signed by Mr. Robertson and by Mr. Abernethy, Mr. Robertson at that time acting on behalf and as agent and engineer of the Shrewsbury and Chester Railway, which has since become amalgamated with the Great Western, with all their rights, powers, and privileges; Mr. Abernethy was at that time acting as engineer for the Birkenhead Dock Trustees. The agreement of the year 1852 was immediately before I became connected officially with the Company. I came into office when the gentlemen, whom I have called the half-tide Trustees, went out; I came in with the low-water basin party. The official seal was transferred to my keeping when I came into office; that is the official seal; these half-tide Trustees were the executive body at that time, and the only executive body of the Trust. The agreement of 1854 is under the seal of the Trustees; it has never been before the Committee—the lease of 1854 was under seal—it is the tenancy of another part of the estate. There is no doubt that the lease was signed on behalf of the Birkenhead Dock Trustees and the party then in power. The Birkenhead Act of 1855, by the schedule, refers to those agreements, and reserves all the rights and powers of the railway companies. The agreements of 1854, and May, 1855, are referred to expressly and affirmed; and the powers and rights reserved—I mean in the schedule at the end and referred to in a clause, keeping alive and reserving all the powers and rights—saving the rights in fact. The Bill which the Corporation are now promoting will not take from the railways any rights of passing through or over the Birkenhead property which were recognised by the Birkenhead Trustees. My view is only the view which has always been taken by the Birkenhead Dock Trustees, when I was advising them. There is nothing at all in the Bill now brought before Parliament which will in any way alter the position of the railway companies as to the right of passage: it leaves them in quite as favourable a position as they were.

Agreements as to south reserve.

Wednesday, 7th May, 1856.

John Bernard Hartley, examined by Mr. Burke. *J. B. Hartley, 7 May, 1856.*

I am a civil engineer, and specially connected in that capacity with the Liverpool Dock Trust; my father before me was the engineer for the Liverpool Dock Trustees; we have either built or rebuilt the whole of the Liverpool Docks with two exceptions; my father and I have been for a series of years past engaged in advising the Liverpool Dock Trustees in reference to works there, and in carrying those works into effect. All the recent works connected with the Liverpool Docks have been done under our superintendence and management; under mine and my father's; mine more recently. I think I have made myself thoroughly acquainted with the requirements of the trade of the port of the Mersey. I am a resident of Liverpool, and constantly at the call of the Trustees upon all professional matters upon which they require my advice. The docks are under my management and superintendence entirely as regards the engineering, overlooked by the Dock Committee. I have also been consulted with reference to the construction of docks in other parts of the kingdom; I have for the last twelve years held, and still hold, the position of consulting engineer to the Hull Dock Company, and have constructed works for them, and have also been called upon to advise other parties. I am aware of the legislation of last year with reference to the dock accommodation at Liverpool; I was examined as a witness upon the Liverpool Dock Bill upon that occasion; the object of the Liverpool Dock Bill of that year was to give a very large increased dock accommodation at the north end of Liverpool, not so much to carry immediate works into effect as to enable the Trustees, by obtaining power to raise a sum of money gradually, to develop the system of dock accommodation, as necessity should arise, at the north end of Liverpool. We were desirous of having power to carry out a large and well matured design piecemeal as the trade required. The Bill brought in contemplated for that object raising a sum of money of 3,500,000*l.*, which was curtailed to 850,000*l.*, to be applied to the immediate necessities of the docks. The Chairman of the Committee which sat upon that Bill suggested that it would be expedient that the Birkenhead Docks also should be placed under the same management as the Liverpool Docks, so as to form a uniform system. Under the recommendation of the Committee a Bill was passed sanctioning the purchase by the Liverpool Corporation of the Dock Estate at Birkenhead. By the 19th clause of the Act, it was declared to be expedient that the Birkenhead Docks should, with as little delay as possible, be constructed

Legislation of 1855.

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and completed in such a manner as to render them most available for the commercial purposes of the port of Liverpool in connexion with the Liverpool Docks; and the Corporation were required, either alone or conjointly with the Trustees of the Liverpool Docks, to prosecute a Bill in Parliament in the next session, that is, the present session, for obtaining the requisite power for accomplishing the several objects aforesaid. The Corporation requested the Dock Committee to allow their surveyor to advise them as to the best means of accomplishing the object they had in view; and this resolution was sent to me as my authority, "That instructions be given to the surveyor to prepare plans for such works upon the Birkenhead Dock Estate as may be necessary to make that estate most useful for the accommodation of trade and shipping in connexion with the Liverpool Docks;" those were my instructions; they were dated the 16th of August; the Act of Parliament received the Royal Assent on the 23rd of July last. Upon the receipt of those instructions I took the necessary steps for advising upon a plan. Prior to that time I had a general knowledge of what had taken place with reference to the construction of docks at Birkenhead from the investigations before the Committees of Parliament and elsewhere; but I had never had anything to do with the inquiry, or anything with respect to the Birkenhead Docks; but being in Liverpool I could not be ignorant, of course, of what had taken place; but I had never gone into the question at all professionally. The mode of accomplishing the objects of the Birkenhead Dock Trustees had been matters of professional interest among engineering gentlemen, so as to form the subject of very frequent discussion. I am tolerably well acquainted with what was contemplated by the engineers of the Birkenhead plans, and of what had been done; I could not avoid knowing what was a matter of notoriety. Mr. Rendel's plan may shortly be described as a large low-water basin, which he proposed to excavate and to maintain at a depth of 12 feet at low water spring tides, and from it there were to be openings into a large float, into which vessels were to pass as soon as there was water enough for them. The plan on the wall marked 1853 is Mr. Rendel's plan; that is made from the deposited plan of 1853. The great distinctive feature of that plan is the formation of a large basin, accessible for vessels up to a depth of 12 feet at low water at all times; and open to the Mersey, without any gate to restrict the ingress or egress of vessels on the water of the Mersey. Its area was about 27 or 28 acres. It was proposed to excavate the whole of that area to the depth of 20 feet 9 inches below the Old Dock sill; that would give 12 feet at low water of spring tide. The Old Dock sill at Liverpool is the datum from which all measurements are made in the Mersey; all the tide tables are calculated upon it. That sill is 8 feet 9 inches above low water of spring tides. Judging from the evidence I have read, I believe Mr. Rendel's intention was, that the docks should be constructed upon the margin of that great float; that the float was to

Origin of present plan.

Mr. Rendel's entrances.

be, I remember his using the word, a large vestibule for those docks. The Dock Company was formed for the purpose of constructing docks upon the margin of that float; but the docks have not been carried out there. The whole of the southern side of Wallasey Pool has been walled up, with two exceptions; there are two small craft docks which open out of it. The access from that outer low-water basin into the Wallasey Pool, according to the proposition of Mr. Rendel, as the plan of 1853 shows, was, in the first place, by a passage with a pair of single gates 100 feet wide, then a lock 500 feet long between the gates and 100 feet wide, and at the south end of the Birkenhead fork, a lock which is now standing, which is 30 feet wide, into the Egerton Dock. There was to be a basin, a float, a pair of single gates, and a lock. I did not feel justified to recommend our Committee to carry that plan out. I had never known of such an area excavated for the purpose of a basin, and being kept free from silting up by the modes proposed to be adopted by Mr. Rendel; I do not believe anything to that extent has been done, certainly not within my experience. The water in the Mersey holds in solution a great quantity of sand and silt, which it deposits in various places; it is a source of annoyance and great anxiety to us. That, therefore, in considering the question, is one subject to which prominent attention should be given; necessarily there must be a large amount of deposit in any inlet from the Mersey, tending gradually, unless efficient means were adopted for its removal, to block up and render useless that large basin. I know the mode proposed to be adopted by Mr. Rendel for obviating that impediment; his proposition was to lay sluices at the end of each fork, at a very little distance above the floor of the basin, and to get a scour by lifting all his cloughs, which is the technical term for the doors of the sluices, the valves to the sluices; as I understand Mr. Rendel's plan, I have no doubt he would have sluices in his gates, though that I am not aware of; but between the lock and the single entrance there was to be a series of sluices; they were to discharge very near to the bottom of the basin; the water above them would be according to whatever the height of the water was in the float; the centre of the sluices would be about 18 feet below the Old Dock sill, and if you added whatever water there was in the float, it would give you the level of the water. I think Mr. Rendel proposed to lay the sluices about 2 feet above the floor of the basin; the basin itself being 12 feet below low water. For the purpose of the sluicing Mr. Rendel proposed to avail himself of the water in the great float, the large area of water which is behind the sluices. By the Act relating to the Birkenhead Docks, as I am informed, the level below which the water may not be reduced is 13 feet above the Old Dock sill, so that unless the water in the float were higher than that it would be impossible to take away water from the float for the purpose of sluicing power, if that 13 feet level was stringently adhered to. It is important for all docks to be kept as near one level as you can. I do not think it is so very essen-

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Passage and locks to the float.

Mr. Rendel's sluicing.

J. B. Hartley, 7 May, 1856.

tial as some people do. The water in the float would, I imagine, be used at dead low water; that would be the most efficient time for using it. There are portions of the year in which the neap tides do not rise so high as 13 feet above the level of the Old Dock sill; in this year there are about 107 days in which the tides do not rise up to 13 feet; that would be pretty much the mean of every year. During those days the single pair of gates intervening between the float and the outer basin could not be opened if the 13 feet level was stringently adhered to; and during those days there would be no water admitted into the float that would be available for sluicing power; if the water was run down to 13 feet in the first instance, all the tides below that could not be let in, so that no water would go into the float until higher tides came. I have not been able to learn any case in which practically such a scheme as that has been carried into effect. I think if any scheme could be devised to carry out this object, if any one wished to carry it out, that Mr. Rendel's plan is calculated to carry it out; but from what experience I have had in Liverpool, I do not think the effect would be what he expects. In my judgment, that large area of nearly thirty acres could not be maintained at an efficient depth by means of the sluicing power proposed by Mr. Rendel. I do not believe there is any analogous case. I do not know if any are similar to that, or anything like that, with 12 feet of dead water at the time you are sluicing, being kept open by means of sluicing. It must be an experiment, of course, if nothing of the kind has been done before, and I do not find that anything has; if the experiment should fail, the result would be that you would have to put other works, somewhat similar to what I propose; there would be a considerable sum of money sacrificed, of course; some of the works would be useful again. Believing as I did that Mr. Rendel's design, beautiful as it was, would not answer the purposes he contemplated, I did not feel I was justified in recommending the Dock Committee to carry out the plan as proposed.

The most feasible scheme of sluicing.

Mr. Rendel's outer basin would not, in my judgment, be available for a harbour of refuge. Whenever in the river Mersey a harbour of refuge is required, that is, during a heavy gale of wind, and all our heavy gales of wind are from the north-west, no vessel could get into it except by steam—it would be right against the wind. The whole of the Wallasey Pool lies open to the north-west; the wind comes down it with terrific force; it forms a funnel. I do not think a harbour of refuge is required in the Mersey; it is a harbour of refuge itself; but I see a great difficulty in the large class of vessels getting in, except by steam; and the small craft to which it would be a harbour of refuge are such that they neither could nor would afford to pay for steam-towing. It was contemplated to have on the east side of the Birkenhead fork a slip for landing passengers and goods. The slip inclining up gradually from low water, the gangway of the vessel would come against it. It was to be a sloping slip, similar to what we have in Liverpool, against which

Harbour of refuge.

Slip in fork.

the vessel would come to lie to discharge her passengers or cattle; her gangway would be opposite to that part of the slip according to the height she was out of the water. The vessel, if she did not draw more than 12 feet of water, would lie afloat at low water; she would always bring up her gangway to that part of the slip which would suit her. If the slip was to rise 1 in 20, it would be 300 or 400 feet long from the top down to the bottom; being on a slope, only one vessel could lie at it at once; to use the slope, being an incline like this, only one vessel could be there at the time; the passengers would have to go a greater length up the slope at low water, and less at high water. The present channel steamers are of various lengths; they vary up from 234 feet down to 197, 193; 162 is the smallest, I think, I have here, that is a Glasgow boat; there is one, the Waterloo, of Belfast, of 234 feet. One of the Ocean steamers which comes to the port is 393 feet long, that is the Persia, one of the Cunard boats, and there are others; they vary much in length. There is the Adriatic, the last new boat now building, she is 354 feet long; that is the last of the Collins's line. I do not know what we should do with that large boat from the Thames. I understood she was going to Milford Haven; we shall have no means of accommodating her in the docks at all. She is to be 673 feet long. It is preferable for the large steamers to go into the dock at once, rather than to land passengers at a slip like that, with all the difficulties of turning round and getting into dock afterwards; I think there cannot be any question of that. The owner of the vessel would prefer it; but, in considering this design, I could not forget that we have now, at this moment, in construction, and expect to have in operation in a very short time, a landing-stage that will receive all those vessels, of whatever class, at all times of the tide. In reference to the convenience of this low-water basin to the coasting vessels and other vessels, there is only that west quay at the Birkenhead fork where they could be accommodated at all to carry on trade. Vessels going into the great float, and vessels going into the Birkenhead fork, must necessarily interfere with each other, supposing the operations carried on at the same time. Taking all those matters into my consideration, I came to the conclusion that the Birkenhead fork, as proposed, would not be an expedient measure, which I could recommend to the Birkenhead Dock Trustees to carry into effect. I do not like it, even supposing we could maintain the depth of it. The length of the outer basin as an access to the float is an objection. A small vessel coming in there would, of course, be inconvenienced by the distance from the river to the locks. She must warp that distance, which, if it was blowing hard, would be a difficult operation, unless she had a steamboat to tow her. In principle, I think that the nearer you can bring with safety your entrance to the river the better, so as to get your vessels into the docks as quickly as possible.

J. B. Hartley, 7 May, 1856.

Lengths of steamers.

New landing-stage for steamers.

Length of outer basin.

I had an opportunity of considering another scheme suggested by

J. B. Hartley, 7 May, 1856.

another engineer, Mr. Abernethy, which had been ventilated, though not quite so much as Mr. Rendel's was; but during the time there has been a great deal of talk about it. It was very much considered before Parliament in 1852. I had access to all the plans and sections deposited on that occasion, so as to have an accurate knowledge of what was contemplated by Mr. Abernethy. His plan differs from Mr. Rendel's to this extent: that, instead of having a low-water basin of 28 acres, as Mr. Rendel proposed, Mr. Abernethy put two pair of gates in front of the basin, and converted a portion of it into a half-tide basin; instead of having the basin open altogether to the Mersey, Mr. Abernethy proposed to put single gates between the Mersey and the outer basin—not locks, but single gates—and then to put locks between that basin and the float. He proposed to curtail the size of the basin as originally proposed by Mr. Rendel as a low-water basin very much. Mr. Abernethy's half-tide basin was about 16 acres; the low-water basin he adopted was some five or six acres; the low-water basin enabled vessels to approach the entrances, and then to pass through single gates when the tide was favourable, to admit them into the half-tide basin, in which they would be shut up. The vessels afterwards would be locked up into the float. I believe Mr. Abernethy proposed to open those gates when the tide had risen to half-tide, and to keep them open till the tide had receded to that level; during that time vessels could get in or out, and being once in, they might be locked up into the great float. In the plan now suggested to the Committee I have not adopted either Mr. Rendel's or Mr. Abernethy's plan. That plan of 1856 is my plan. It differs from that of Mr. Rendel in that it does away with that large outside basin open to the Mersey, and does not, as Mr. Rendel proposed, leave the whole of the great float dependent upon a single pair of gates. There are in no case less than three pair of gates between the float and the Mersey. It does not adopt so much of Mr. Abernethy's plan as consists of a half-tide basin. I do not call it a half-tide basin; it may be, under press of trade, used that way, but the practice would be the other way. The plan of Mr. Abernethy was to have a single gate there, open only at certain times of the tide, so as to render that inner basin available as a half-tide basin; instead of having single gates, I propose to have locks. I propose to have an entrance basin from the river, similar but not so large as that proposed by Mr. Abernethy, my object being to keep that as small as I possibly could, having regard to the efficiency of docking vessels; from that I propose to enter into an intermediate dock of nearly 9 acres by means of three locks, one of 100 feet in width, another 50 feet wide, and another 28 feet in width; those are calculated to receive any vessels that come to the port, or that have hitherto come to the port. Those locks then open into an intermediate dock; and, if we choose, if there should be a great pressure of vessels, such as a large fleet arriving, or a large fleet departing, we can then use that intermediate dock as a half-tide basin; but in practice I wish to avoid using it as a half-tide basin, the practice being to lock up

Mr. Abernethy's plans of 1852.

Half-tide basin.

Mr. Hartley's plan.

Locking to be the rule.

as much as possible, and only opening it when the water rises to the level of the water inside. In times of pressure, the operation would be to throw the whole of the gates in the locks open, and to run the water down in the intermediate dock to meet the tide of the day earlier, so that vessels as they arrived might be passed at once into the intermediate dock until it was full; the outer gates would then be closed, and the water in the intermediate dock and that in the great float run to a level, so that vessels would then be passed into the great float; and whilst that operation was going on they might still be passed into the intermediate dock. We should have the advantage of using that as a half-tide basin if necessary; but inasmuch as a half-tide basin, from the necessity of changing the water, is much liable to silt up, it is very desirable not to use it, except under extraordinary circumstances, as a half-tide basin. I have made provision whereby I obviate the necessity of using it as a half-tide basin, which is objectionable by reason of the great liability to silt up; at the same time I can avail myself, in times of great pressure of business, of that basin as a half-tide basin. My plan differs from both the others: it does not adopt the plan of Mr. Rendel, of a basin open to the Mersey, and it does not adopt the half-tide basin of Mr. Abernethy, which was dependent upon a single gate opening to the Mersey. I adopt a certain system of lockage, in connexion with the basin, which may be used as a half-tide basin, in the same way as in Mr. Abernethy's plan. I prefer a system of locks into the float. The difference between Mr. Abernethy's plan and mine is this: that supposing our sills to be laid at the same relative depth, as soon as a vessel can approach, and there is water for her over my sills, I can take her into dock; whereas he must have waited till the tide floated to half-tide to take her in. That would be a great convenience, as accommodating the smaller class of vessels first, that could approach at an earlier time of the tide. In Mr. Abernethy's plan, those vessels must have laid outside till half-tide, and have come in with the other vessels which were gaining access at the same time. There would be an accretion of vessels there up to half-tide; in my plan, the smaller vessels can approach the locks, and get in long before the period when they could have got in, that is, at half-tide, according to Mr. Abernethy's plan. That will enable us to do so much more business, because all those smaller vessels would be placed out of the way of the larger vessels before they came, and we should be able to work the large vessels with so much more facility. Mr. Abernethy proposed to lay his sills deeper than mine, but that would not affect the access to this basin, except that he could take in larger vessels sooner than I could. I think I could not maintain his depth of sills. I propose to lay mine 12 feet below the Old Dock sill. I have laid mine as low as I think it is safe to lay them. I believe Mr. Abernethy's were some 18 or 19 feet below the Old Dock sill. I think we can maintain those sills at the level at which I have laid them, but it would require great care, and constant attention, and great anxiety. My impression was, that Mr. Abernethy's and Mr. Rendel's sills were

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Half-tide basin at option.

Distinctive features.

Mode of working.

Depth of sills.

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the same; but I do not think they could be maintained. We have no sill on the Liverpool side of the river more than 6 feet, or 6 feet 7 inches below the Old Dock sill; that depth involves great anxiety and constant attention. By my plan, as soon as a vessel could approach the lock, we could take her in. Supposing a vessel drew 12 feet of water, as soon as there was 12 feet of water upon my sill I could take her into dock. By Mr. Abernethy's plan, the tide must have risen 4 feet 9 inches above that; that is the half-tide level. I received my instructions in the month of August, 1855, and forthwith gave attention to the subject of those instructions, with the view to a Bill to be promoted in the present session. I furnished plans and a report to the Dock Committee. When I reported I sent in two plans. It had been suggested that accommodation should be provided for this extremely large mammoth steamer, and I provided on one set of plans a design for taking her in. On the other set of plans I proposed a plan somewhat similar to the one now before the Committee. I sent in my plans to the Dock Committee, as a matter of course they sent them up at once to the Council, and the Council then returned them to the Dock Committee, with a request that they should report their opinion upon them. The Dock Committee referred them to the Committee of Works. All the works carried out are passed through that Committee, and they called in to their aid, to advise them, the manager of the Cunard line of steamers, and the agent of Collins's line of steamers, and one of the most eminent ship-building gentlemen in the port, Mr. John Laird, who has had a great deal of experience; they called in those gentlemen to advise them as to those plans. One half of the Dock Committee is composed of the representatives of the ratepayers; the other half is composed of members of the Town Council, a great many of whom are large merchants and shipowners. The Dock Committee does represent most efficiently the great interests involved in the trade of the Mersey. I think on the Dock Committee there are two of the largest shipowners in the world. The Dock Committee, aided by this advice, took into consideration the plans and reports which I laid before them. My second plan differed in some slight degree from the plan now proposed, inasmuch as I only proposed, in the first instance, to make the lock 80 feet, which is now the large 100 feet lock; and I also proposed to lay the sill only 10 feet below the dock sill, instead of 12; and at an interview with these gentlemen it was suggested that the large dock should be made 100 feet wide, instead of 80, and that its sill should be laid at 12 feet, the same as the other. These plans, as they now come before a Committee of Parliament, are the result not only of my suggestions, but of certain suggestions emanating from that interview with the gentlemen to whom I have referred. I gave my concurrence to the extra two feet depth to that lock with very great reluctance. I think I can maintain that depth upon the Birkenhead side for two reasons. In the first place, we shall have more scouring water to help us to keep it clean; and in the next place, being on the weather side, or

Committee on plans.

Increased depth of sills.

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under the lee of the land, though on the westward side, there is not that motion in the water, or that quality of deposit that we have at Liverpool; there is a great tendency to deposit, but it is in some degree a different kind of deposit; it is not that coarse kind of sand which we have across the water, except under certain circumstances. The keeping the bottom of the entrance deep enough to gain access to the basins of various dimensions is the great difficulty with which I shall have to contend, and it is the knowledge and the fear that I shall have to contend with it that has made me reduce the outer basin to the smallest possible dimensions I can make it. I am not at all sanguine that I shall be able to keep my entrance clear by sluicing at all, but I think means may be taken. I propose, for instance, to build the whole of the bottom of that outer basin of masonry; to pitch it, that is, to put a masonry floor upon it, so that no inequalities may be formed by the process of sluicing it. I think it is very probable that there will be an accumulation in front of it. The only means I can devise for removing that will be either by dredging, or some other artificial means which would have to be brought into operation. I propose to bring the sluices round the whole of the walled sides of that parallelogram of that square, so that I have three sides of it with sluicing power. It is not in evidence that Mr. Rendel intended to do so, but he could bring them all round here; but it is here in the centre that I am afraid the accumulation will take place. The set of the tide on that shore of the Mersey is pretty nearly north and south. There is not much difference in the strength of tide upon the Birkenhead and the Liverpool shore.

Deposits on the two sides.

Arrangements for scouring the basin.

The instructions supplied to me were to fulfil the Act of Parliament in rendering the Birkenhead Docks available for the commercial purposes of the port of Liverpool in connexion with the Liverpool docks, with as little delay as possible. In considering those instructions, the first and the most important object to be attained appeared to be to get the means of the most speedy communication between the great float and the river. The walls are built and the ground is made on the whole of the south side of Wallasey Pool, and in order to render it more available for commercial purposes it appeared to me desirable to have in the first instance, with as little delay as possible, another access into the river Mersey. The pool is only partially excavated; it will require a still greater excavation in order to render it available for the anticipated trade. Speaking with respect to docks generally, the more uniform you can keep your level the better, but I do not want to be tied down to any permanent level; I propose to take advantage of the means that Mr. Rendel had down to 13 feet, according to circumstances. Looking at the amount of trade that may be anticipated to frequent the great float, the greater the amount of accessibility, the more numerous and the more available the openings the better; also the greater the depth of access the better, if we can maintain it. All these considerations would lead me to the adoption of such a plan as would give the greatest

Instructions for, and objects of, plan.

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available depth, and the greatest number of accesses that could be maintained efficiently. To carry out those objects I proposed the plan now before the Committee. The first feature on my plan is an open basin of about 4 acres, through which vessels will approach the gates. That basin is proposed to be made 17 feet below the Old Dock sill. When the vessels reach that basin in getting to the locks, they will be out of the action of the tidal stream. From that outer basin I propose three locks, opening into the inner dock or basin; the size of that inner dock or basin is nearly 9 acres. I propose to excavate that inner dock to 18 feet below the Old Dock sill. The width of the three locks proposed is 100 feet, 28 feet, and 50 feet. The sill of the 100 feet lock is to be 12 feet below the Old Dock sill; the depth of the 50 feet lock is the same; and the depth of the 28 feet lock is 8 feet below the datum. I propose to devote the 50 feet lock to the great majority of trade frequenting the Mersey; sailing vessels and screw steamers are the great majority. I propose to devote the 100 feet lock to the largest class of steamers—the paddle-wheel steamers. The 28 feet lock is for the small river craft and the smaller size coasters. I propose to divide the locks by an intermediate pair of gates, so that they need not waste water when they are only working one ship at a time, being only big enough to occupy half the lock. These diagrams (*producing the same*) show the class and size of ships that these might be used for; that represents the Adriatic, the largest of the Collins's, and the Himalaya, and we may take in those at the same time, or one might be going out and the other coming in. We could take in at a time about 8000 tons; in that case, taking those vessels in, there is passing there 8725 tons, there would be 7771 there, going through at the same time; those are cases that would occur very rarely except upon large arrivals. It is a very rare occurrence indeed that we have the neap tides less than 10 feet; we have not one under 10 feet this year, I believe; they have occurred as low as 9. With the very lowest we should have over the sill of our largest lock 21 feet of water, and over the sill of our smaller locks 17 feet of water. The average of neaps is 11 feet 3 inches. With a 19 feet tide, that is an average spring tide, at two hours' flood, there would be 13 feet 9 upon my sills. All vessels drawing less water than that could get in after two hours' flood. If it was an object for the river craft to be taken into the dock, we could take them in through the 50 feet entrance, supposing they arrived in sufficient quantities to make it worth our while to take them in, or we could take them in on the first hour's flood. That is a greater accommodation than is afforded by any other dock on the Mersey. Vessels drawing 21 feet of water would get in at three hours' flood—at three hours' flood there would be 22 feet 3 inches on the sill; and from that time to high water every description of vessel in the Mersey could get in easily; so also in getting out in the same proportion. In 1854 there were 17,053 arrivals in the Mersey, from the 1st of December, 1853, to the 30th of November, 1854, coastwise and

Proposed basin and locks.

Water on sills at neaps and springs.

Arrivals in the Mersey.

foreign. Of 12 feet and under, out of that 17,053, there were 13,130; of 13 feet draught there were 1021; of 14 feet draught there were 587; of 15 feet draught there were 445; of 16 feet draught there were 387; of 17 feet draught, 379; of 18 feet draught, 340; of 19 feet draught, 271; of 20 feet draught, 250; of 21 feet draught, 148; of 22 feet draught, 65; of 23 feet draught, 17; of 24 feet draught, 3; and none beyond 24; so by this you will see that only 85 out of those 17,000 vessels could not have got into my docks at neap tides. There are only 85 which drew more than 21 feet water, and which could not have got in at neap tides. The sills at Liverpool being considerably higher than the sills proposed here, involve a certain amount of inconvenience in working vessels into the docks; we have not so much time to work them in as we should have if we had the sills lower. On account of changing the water as seldom as possible, we run down the water in the docks to meet the tide if it is on the increase an hour and a half, or perhaps two hours, before high water, but the object is to keep the gates open as short a time as we possibly can, to avoid getting fresh water into the docks as much as possible. Our numerous entrances give us the advantage of doing the business in a short time, say two hours before high water; we close the gates as soon after high water as possible. It is a very rare thing for a gate at Liverpool to be kept open an hour after high water. We could do a much greater amount of work with three entrances at Birkenhead than we could possibly do with three entrances at Liverpool; if a vessel arrives at Liverpool the first hour of flood, she has to wait till the water is let down in the docks, or the tide rises to the height of the water in the docks. The inner entrances from the intermediate dock to the great float (because I do not wish it to be called a half-tide basin) are these: there is a passage of 100 feet opposite, and in a line with the 100 feet lock; there are two locks, exactly similar in dimensions to those outside, of 50 and 28 feet; that is to say, three openings into the float opposite to and of the same width as the three openings into the Mersey; but there is this difference, that whereas the 50 feet opening and the 28 feet opening are locks, the 100 feet opening has a single pair of gates, and the inner 50 feet lock is not so long as the outer 50 feet. The large outer lock is 550 feet long; the outer 50 feet lock is 400 feet long; the 28 feet lock is 165 feet long; the 50 feet lock is 250 feet long; and the 28 feet lock is the same size. The small lock is of the same dimensions in both cases; the 100 feet is merely a passage. The outer sill of the 50 feet lock is the same as the other sills, but the inner sill is 8 feet below the datum; the sill of the smaller lock is 8 feet also, both the same as the outside, and the sill of the 100 feet passage is 8 feet. The outer basin will have sluices all round; the inner basin is not to be sluiced; we do not expect to have any accretion there; if there is, we shall dredge it. I have made provision for laying the locks and the passage dry, whenever necessity requires it; I intend to have a well and steam-engine connected with each

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Convenience of number of entrances.

Inner entrances.

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series of the locks, so that we can pump them dry if necessary, inasmuch as at the least ebb that we can have at any time, an extraordinary ebb, that is 10 or 11 feet below the datum, we shall still have a depth of water in the locks; to keep those locks in good order we must have the means of drying them, in order to repair them. I should like to make an alteration in the access out of the Egerton Dock into the great float; the access now is through the Morpeth Dock, where there is a single pair of gates at an entrance of 50 feet; and then, between the Morpeth Dock and the Egerton Dock, there is a caisson; there is a pair of reverse gates and a caisson. Now, in using that, if the caisson is not in place, the whole of the float is depending upon the Morpeth Dock gates, and I want to do away with the risk of that, and to have gates instead of a caisson. There is a passage at present between the Egerton Dock and the float, 70 feet wide, which, when worked at all, is worked with a caisson; the caisson will fit that as well as the other opening. I want to make that 70 feet passage into a lock, instead of as it is now, by putting permanent gates there. That will add very much to the security of the works, because if anything happened to the Morpeth Dock gates and the caisson was not in its place, which it never is, except when the Morpeth Dock gates are open, we might have very serious consequences; it is a matter of precaution, in order that the great float shall not depend for the penning up on one pair of gates; that is a risk I do not like to run.

Alteration at Morpeth and Egerton Docks.

The great float will be sufficient for the purpose of dock accommodation at Birkenhead for a very long time—I mean, in fulfilment of the instructions to lay out a system there in such a manner as to render the Birkenhead Docks available for the commercial purposes of the port of Liverpool in connexion with the Liverpool Docks. Wallasey Pool and the great float will supply great accommodation, in addition to the dock system on the other side of the Mersey; and by means of the plan suggested will be made more readily accessible from the Mersey than by any other plan I have had under my consideration, in my opinion; that is the object I have sought to carry out. If further dock accommodation be required hereafter on the Birkenhead side, I should like a system of docks on the south reserve; it is very convenient, and good docks could be placed there, opening from the river docks for whatever trade they might require them; you must except the timber trade, which requires peculiar docks. I merely speak of what might be done in case the necessity should arise. I prefer a lock to a caisson, because the caisson when in place is a vessel moored against the face of the wall, that is across the face of the opening. Whilst that is in place, and the outer gates are open, the access to the pool is perfectly hermetically sealed. The caisson is sunk by valves letting the water in, and then it is pumped out to raise it. By the Act of last session the Liverpool Corporation had to pay to the Birkenhead Trustees and the Birkenhead Dock Company a very large sum of money, but I had nothing to do

Docks in the south reserve.

with the amount; it was 1,143,000*l.*; by the Act they take power to raise 500,000*l.* additional. My estimate for the works exclusively Parliamentary is 680,000*l.*, but there is a good deal of work to do besides that. The apparent cost to the Liverpool Corporation is first the purchase, and then the 680,000*l.* But there is other work to do which they will have to spend money upon. There is the deepening of the pool; there are powers already to do that and other things. My estimate is merely for the work for which we at present possess no power. I think the question of the great float will not come before you, inasmuch as it is already fixed and is going to be carried out; we are on the eve of letting the works; I believe the Corporation are almost about letting the work to deepen the float. The powers are, I believe, 30 acres from Mr. Rendel's river entrance backwards, to the depth of 10 feet below datum; there is to be no alteration of the great float as prescribed by Act of Parliament; the depth is to be 10 feet below the datum for a certain distance, by the Act of 1853. In Mr. Rendel's plan, the outer sill of the large lock according to the deposited plan is 18 feet 6 inches below the datum. The whole of the basin, from the entrance to the river, is to be 20 feet 9 inches below the datum, and the entrance to the lock 18 feet 6 inches. The depth of the basin entering the river is 20 feet 9 inches; my basin is 17 feet. I pave all the bottom of it; I make it as small as I can, in order to clear it with the greatest facility; to have the least risk; to reduce it to the minimum as far as I can; then the inner sill of Mr. Rendel's large lock is to be 10 feet below the datum; that is to say, the depth of his sill is to be the same depth as the float is to be excavated. The outer sill of his lock is 18 feet 6 inches, and the inner 10 feet below datum, so that Mr. Rendel would have 6 feet 6 inches more water than I shall. The walls on the south side of the pool are put in, but the excavation has yet to be done; it is only done to a limited extent; the walls on the south side have been put in by the parties in reference to the Parliamentary limits to which the excavation may be made; any alteration in the depth below the depth of those walls would interfere with the security of those walls. I cannot tell the difference in expense between my plan and Mr. Rendel's plan; I know very little about the expense of Mr. Rendel's plan. I have not gone into that question at all, I have merely confined myself to my instructions. I think, if anything, mine would be dearer. I have a very great quantity of expensive masonry in those locks. I have five locks where Mr. Rendel only has two, and one of Mr. Rendel's has been built. I have much more expensive masonry, but then Mr. Rendel has very expensive work—he has a tidal low-water basin. I do not know what Mr. Rendel's estimates are, but, judging from the two works, I should think mine would be the most expensive of the two.

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Estimate and total cost.

Excavation of the float.

Relative cost of the entrances.

J. B. Hartley,
8 May, 1856.

Thursday, 8th May, 1856.

Cross-examination.

John Bernard Hartley, cross-examined by Mr. Webster.

In August of last year was the first time that my attention had ever been professionally called to the Birkenhead Docks; neither my father nor I at any time have given evidence upon the subject, or directed our attention particularly to it; I studiously avoided knowing anything about Birkenhead. The silt and sand and deposit in the Mersey are of a heavier character on the Liverpool side than on the Birkenhead side; that I take to be owing to Liverpool being a lee shore; I do not know that I ever expressed any opinion to the contrary: I know it, from having made observations since I have had this question in hand.

Character of deposits.

Wherever a wave gets stilled, there the mud deposits. I do not think that each of the basins along the Liverpool side has deposits varying in character, the northerly basins having heavier deposits, heavier materials, and the southerly ones lighter deposits; I do not think there is any difference in the character between one place and the other: there is in the interior docks, but not in the basins. The further, of course, you get your docks in from the basins, where there are basins in front of them, the mud becomes lighter. There is very little difference in the outer

Inner docks.

docks; in the inner docks, being more recessed than the others, there is more; where the docks are more in from the river, the mud is lighter. We have only three open basins now at Liverpool recessed, similar to the open basin which I have in my proposed plans for the Birkenhead Docks, with this difference, that all the basins upon the Liverpool shore have horns, or piers to them, which I do not mean to put to this. Those horns, or piers, are to protect a vessel after entering. In the Brunswick Dock the deposit is of a heavier description than in the Bramley-Moore or the Nelson Docks, because it is nearer the river; the reason is evident. We have a bank there called Pluckington Bank; it is entirely sand; fine sand, not so coarse as it is higher up the river. The sand of Pluckington Bank is not of a finer character as regards the deposit than the deposit of sand at the north shore docks. The difference in the character of the deposit is that it is heavier in the Brunswick Dock than in the Bramley-Moore and Nelson Docks, because it is nearer the river. The further the docks are from the river the deposit is of a different character; there is also certainly less deposit. The distinction between the character of the deposit in the different docks, is that those which are further from the river have less, and also of a lighter character, than those nearer the river; it becomes more light, and as they are recessed from the river it becomes sand, mud, and silt. I have made inquiry as to the character of the deposit in the Morpeth Dock; it is

chiefly mud. One of the objections suggested to Mr. Rendel's plan of a low-water basin, was that the entrance was so very far from the Mersey as regards getting vessels into dock. In regard to the facility of getting deep-water sills, the further in from the Mersey the better for the purpose. It was to some extent a point with the eminent engineers who supported Mr. Rendel's plan in 1844, and in other years, that by reason of his having the principal entrance 2000 feet from the Mersey he could get the proposed depth of sill. The Liverpool Docks are all worked to the tide of the day; between high springs and neaps there is a gradual variation, from 11 feet 3, the average neaps, to 18 feet, the average springs; the difference being 6 feet 9. The greatest variation between any two successive days is very trifling; about 2 feet 6 is, I believe, the greatest fall, if you take the tides as they rise, say, for instance, there is a 17 feet 3 tide followed by a 19 feet tide, that is only 1 foot 9 rise; the higher or the hotter the springs the greater the variation; I have known when the difference between two successive tides has been as much as four feet, but that is an exceptional case. We have sometimes greater variations than that. In the Queen's Dock, before we enclosed the Queen's Basin, there were a great many small craft that used to come into that dock, and the practice was to run the water down to meet the tide in the dock; then, of course, we had whatever we ran down, besides the fall of the tide. That would be making the dock approach a half-tide basin. We ran the tide down to a certain extent, for the purpose of admitting the small craft at as early a period as possible; thus doing more business, but it is a very bad thing to do. The quantity of small craft in the Mersey was 13,000 out of the whole 17,000; that 13,000 did not include the river craft; it was vessels coming in foreign or coastwise; out of the 17,000, 13,000 would be what are called the small craft, and in addition to that there are the river craft and the flats. I cannot give the Committee any idea of the number of flats and river craft that would have entered the docks during the same period; I have no return of that; it would be very large. Among the objections mentioned to the entrance to the low-water basin, was the difficulty in sailing vessels entering with a wind from north to north-west, without steam; I do not see how a north-west wind would be a fair wind into that basin. Infinite objections were raised in former years to that basin; I do not remember them; I have not gone into the question of what was said before; I have given my own view of the matter; it was virgin soil to me as to what had taken place before August last. I made no objection to Mr. Rendel's plan on account of the slip in the Birkenhead fork of the low-water basin, to which steamers might come, from the varying level; I think it is very well adapted to a varying level; my objection was, that from the peculiarity of the slip only one vessel could lie there at a time, and when she wanted to go away, she must be wound round, which would be inconvenient. I am acquainted with the slip merely from having heard it described to be a sloping slip; I have been at

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Variations in level

River craft and flats.

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Fleetwood, but I saw no slip there. I am not aware of the way in which the steamers are accommodated at Fleetwood. I have been at Granton Pier; there is a large amount of trade done there. I am not to be understood to say that a slip of this kind, properly adjusted, would not be extremely useful for the general trade of the port; I do not find any fault with the slip at all. My objection to Mr. Abernethy's plan was, that he never opened his gates before half-tide, or shut them before half-tide. There is a lock at the end of the Birkenhead fork already completed. If the authorised plan should be carried out, that lock would be suitable in connexion with the Egerton Dock for passing the small craft at all times into the upper float. I presume it was laid out for that very purpose; it would answer perfectly well if the low-water basin is maintained. I do not know what has been the actual expenditure upon that lock; I only know that the lock is made; I know that the wall across the head of what is to be the great low-water basin, the Birkenhead fork, is built, and I understand the sluice is put in; the sluice and the walls connected with it at the head of the fork are, I believe, completed. There was nothing referred to me at all about the expenditure of money. I was asked to make a plan for making entrances into that great float. The fact that something like 90,000*l.* has been expended on that which may be rendered useless by my works, would not have stopped me for a moment from proposing what I thought to be the better plan. If there had been 300,000*l.* expended there, I should have proposed what I thought the best plan. In the plan I have proposed, I have given equal accommodation as far as I thought I could do it consistently with safety, to what that Birkenhead fork and lock will afford; that is to say, accommodation, for that class of vessels which the Egerton Lock would accommodate, I have provided for in my plan.

Destruction of works.

I propose to annihilate everything done there as to the accommodation of the trade that that was intended to apply to, and to provide for it in other ways. One of the reasons for proposing that alteration between the Egerton Lock and the great dam, was to prevent the water of the great float depending upon a single pair of gates for its protection; the caisson is never in place, except when they want to lower the water in the Morpeth Dock; the caisson could not be used for the very same purpose as the gates I propose there, because you could not have it there with vessels continually passing from the Morpeth Dock into the float; it would block up the passage entirely. I believe that caissons are constantly used instead of gates in the Thames and places of that kind; we have not used them at Liverpool. That which Mr. Rendel will explain as having been provided for at that place by caissons, will not answer so well as a lock. On a comparison of advantages, I consider mine as preferable, looking to the safety of the great float. I proposed to lay the 50 feet lock 12 feet in the first instance, and the 100 feet lock I proposed to lay at 10 feet; the facts upon which I con-

Gates preferable to caissons.

sider the laying the sill at 12 feet a great risk are founded upon my Liverpool experience. *J. B. Hartley, 8 May, 1856.*

The sub-committee of works of the Dock Committee consisted of the Chairman, Mr. Shand, Mr. Rankin, Mr. Smith, Mr. James Holme, Mr. Langsdale, and Mr. Eyre Evans. Mr. James Holme, Mr. Langsdale, Mr. Shand, Mr. Eyre Evans, and the Chairman, Mr. Turner, are members of the Town Council. I think in that inquiry there were others added to the Committee, I think Mr. Brocklebank and Mr. Mann—Mr. Mann is a member of the Council, Mr. Brocklebank is not. I said I did not intend to be tied down to any level in the works, except 13 feet; I intend to admit the high spring tides; if the works should be carried out as proposed, the variations will be from the high spring tides down to the 13 feet level. The lowest sill of the Liverpool Docks is 6 feet 9 inches below the datum; the sill at the Wellington Half-Tide Dock is the lowest; the Huskisson Dock is 6 feet; the Brunswick is 4 feet 6 inches; the Brunswick outer basin is 6 feet. An ordinary neap tide is 11 feet 3 inches above datum; the lowest neap tide, though we have not one this year, is 9 feet 3 inches; with an ordinary neap tide we should have 17 feet 9 inches, and with a low neap tide 15 feet 9 inches on the sill of the Huskisson Dock. They will take in a vessel if there are 3 inches to spare on the sill. As the docks now exist at Liverpool, we cannot take in the larger class of vessels at all during a neap tide. The tides lift a foot or eighteen inches a day, and you would have to wait till they rose from 9 feet to whatever the vessel's draught would require: many vessels have to wait till they get up to 14 or 15 feet. For a vessel drawing 20 feet of water, there are 192 days in a year in which we could not take that vessel into any of our docks. We should require a 15 feet tide to take a vessel drawing 20 feet water into most of our docks: 15 and 6 make 21 feet: there are 192 days in this year in which she could not go in. The sill at Birkenhead, according to Mr. Rendel's plan, is 18 feet 6 inches, and mine 12 feet below datum; those are the outer sills of the locks of both. The widest gates that we have working now at Liverpool are 80 feet, that is at the Huskisson Dock. We are now constructing a lock of 100 feet wide; it will be opened, I suppose, in twelve or eighteen months. The widest at Birkenhead of Mr. Rendel's is 100 feet I believe; Mr. Rendel's lock and mine are pretty much alike; I think 500 feet in length Mr. Rendel's, and mine 550; they are on a par. Mr. Rendel's Docks at Birkenhead were projected in 1844, and we had no gate of that width at the time; but Mr. Rendel's plans have changed, I think, according as the necessities of the trade have shown him that he must go to greater widths; and we have done the same. The necessity disclosed by the Birkenhead movement was not the first time Liverpool ever set itself to provide the accommodation; I think our first 70 feet gates were made and opened long before the Birkenhead Docks were commenced or projected; the

Sub-Committee of works.

Rise of tides.

Sills and widths of entrances.

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80 feet gate was projected about 1846, and opened about 1848; that was subsequent to the first Birkenhead Dock Act. I do not remember whether in the first Birkenhead Dock Act the gates were 75 feet. The size of ships of late years has been increasing enormously. Though the size of the ships is increasing, their draught is not increasing; I do not think that laying the sills lower is so much an object as making the entrances wider. The lower you have the sills the greater time you have in which the larger ships can enter. If Mr. Rendel's plan is practicable, he will have 6 feet 6 inches more at Birkenhead than I propose; he will be able to take in ships earlier than I shall; and measuring by the depth of the sills he will have 6 feet 6 inches more at the entrance to the upper float than I now propose; there will be 18 feet 6 inches against 12 feet. Comparing the smaller lock, from the Birkenhead fork, that is 30 feet in width, as against mine which is 28 feet, and as regards depth of sill, he has 17 feet against 8 feet; he will have 9 feet more than I. The Egerton Lock will take in a vessel of 450 tons burden. I do not exactly remember the length of it, the width is sufficient.

Width of entrances and water on sills.

Sluices.

The sluices on each side of my entrance basin will be supplied with water, partly from the inner dock and partly from the float; employing the water for lockage and for sluicing purposes will make a draught of water upon the upper float; to the extent that you use it there must be that draught upon it.

Railways.

There is no especial accommodation for railway passengers in my plan at all; I do not propose it, they must go to the railway. The Birkenhead Ferry belongs to the Corporation of Liverpool; the Seacombe Ferry belongs to Mr. Smith. The Corporation has no interest in any ferry, except Birkenhead, that I am aware of. My estimate of the cost of deepening the pool—the great float—I put at 180,800*l.*; that is excavating the whole of it, according to the Parliamentary plan, 30 acres excavated 10 feet, and the remainder 8 feet; about 2,000,000 cubic yards of excavation in round numbers.

Deposit of spoil.

The spoil will be put, where it was always intended to be put, I believe, upon Mr. Viner's land. We do not want it for the reserves; we are not proposing to fill up the reserves at present; whatever the quantity and cost, I propose to put it on Mr. Viner's land; that is, above Wallasey-bridge, on both sides of the Wallasey-road, but not on both sides of the Wallasey-bridge, if you mean on the north side. In the report made to the Committee, the object in view is stated to be obtaining the greatest amount and the most efficient accommodation at the least cost; and to bring the land on the south side to be immediately available; the whole of that, up to the furthest of those little docks, now belongs to the Corporation. I do not propose to proceed with making the south reserve for the present. I do not think the making of that south reserve a matter of vital importance to the railway companies; whatever may be the interest of the railway companies in that south reserve, in having it made, that is not a matter that entered into my calculation; I thought of nothing as regards the railway companies in that respect.

South reserve.

The area of the docks now in operation at Liverpool is 191¼ acres, that is exclusive of basins; that includes half-tide basins; all floating space; we have nearly 16 acres of dry basins in addition; we have only at present three open basins which are dry. We have three basins at present, and a fourth constructing; we have the Sandon Basin, the Prince's Basin; the George's Basin. The Queen's Basin we have recently stopped up, that is without an entrance into it. Last year we proposed two more basins; the one we are now constructing north of the Huskisson Dock, and there was another proposed at the extreme north. The number of openings to the docks, taking them altogether, is about eighteen; we have two openings into one basin in two or three instances. It is stated in the Report that whenever additional accommodation is found necessary at Birkenhead, we should propose to provide it in the first instance at the south reserve, in connexion with the existing works, as shown upon the plans. I have not those plans here; they do not form any part of this work; they form part of the way in which we proposed to deal with the south reserve; but they were thrown overboard altogether. The south reserve is to be left in its present state. I can give no idea as to how long it is to be left in its present state; I cannot answer for what the Corporation may do with it hereafter. The Corporation are equally interested in developing the property of the Dock Company as well as the other, it all belongs to them. The railway companies are vitally interested in getting the Birkenhead works completed some way or other as soon as possible. The reason why neither the south nor the north reserve would be filled up at present is, that when we have to make docks hereafter we should have to shift all that spoil at a great cost. No docks are sketched out in the present plan; I contemplate at a future period making docks there; and I in my Report mentioned that I did not lay out anything upon the north reserve because the change of circumstances in the trade of the Mersey has been so great that what we do to-day we may find inconvenient in twelve months. It has always been the case with us on the Liverpool side that we have never anticipated the trade sufficiently with reference to the breadth of vessels, which is changing and increasing so much that what we have done now may in four years be too small. I think there is so great a probability of their being more dock accommodation wanted at Birkenhead than what the present plans provide, that I prefer keeping the north and south reserves in such a state as may render it more convenient to build docks there; not that they will be soon required, but that eventually it may be convenient to make docks upon them. I should propose that the first place to make a dock upon should be the south reserve, and the north reserve to be left till the period when still further dock accommodation should be required. Whichever work is carried out, sufficient quays must be made, which would be applicable without filling up the south

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Docks in south reserve.

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reserve. By the existing Acts, a broad esplanade, some 60 feet broad, was to be reserved for the public round both those reserves. The providing that does not form a portion of the estimate; but the river wall of the south reserve, which is yet to be built, will have to be built, and that wall, when built, must of course be backed up; the excavations coming out upon the plan now before you will be used to form quays round the docks and along the length of the river wall, and, of course, to that extent will form those esplanades. As to the north reserve, there is nothing done up to this time, except that the river wall is built, and it is backed to a slight extent; but there are no esplanades there at all. I am not aware that there exists an obligation, under Acts already passed, to provide for a public esplanade round both reserves, both south and north; I am not aware that it applies to the north reserve; I know it does to the south. The Corporation of Liverpool, in making the purchase, was, I apprehend, aware that they made the purchase with that obligation. I have not provided for the new portion; except that, by completing the river wall on the south and north reserve, I should leave a certain breadth of embankment; and that might be formed into an esplanade if required; it has formed no part of my present plan. [The 19th and 20th clauses of the "Birkenhead Dock Trustees Act of 1850" were read to the witness as follows :—S. 19. "And whereas a map or plan, being the plan hereinbefore referred to, has been prepared by the said James Meadows Rendel, the engineer of the said docks, showing the sites of the said lands, called the north and south reserves; the lines of river and side walls, and open spaces, to be reserved along the same; the great tidal basin and temporary dam across the entrance thereto from the river Mersey; the temporary and intended permanent dam across Wallasey Pool; the Woodside Basin and beaching ground for coasting vessels within the same; the Morpeth and Egerton Docks, and the present entrance into the said docks; the public road to be constructed by Her Majesty's Commissioners of Woods across the north reserve; the public quay; the temporary and permanent railway communication to be provided by the said Dock Trustees; and generally the temporary and permanent works already constructed and yet remaining to be constructed by the said Dock Trustees, and by the Commissioners of Her Majesty's Woods, Forests, Land Revenues, Works, and Buildings respectively." S. 20. "And be it enacted that such part of the land hereby vested in Her Majesty as aforesaid, or as is coloured blue upon the plan lastly hereinbefore referred to, lying on the west side of the line of the said intended road, as defined on the said plan, and extending along the margin of the intended great float, and the north wharf wall to be constructed by the Trustees of the said docks immediately above the said intended permanent embankment to the depth of its extreme point of 380 feet, or thereabouts, behind the said wall, shall at all times be kept open and unenclosed as and for a public wharf and quay, and for the convenient opening and shutting

Public esplanades.

Act of 1850.

of the dock gates, and the working of vessels into and out of the great float; and the Trustees of the said docks, and the owners and occupiers of lands adjoining, and all other persons shall have free use, in common with the owners and occupiers for the time being of the lands so vested in Her Majesty as aforesaid, of the said piece of land so to be kept open and unenclosed, and of the north wall so to be constructed by the said Trustees as aforesaid for the ordinary purposes of a public quay, and for landing and shipping merchandise, and also for the purpose of communicating with such public road as aforesaid, but nevertheless without prejudice to the reasonable accommodation required for conveniently working vessels into and out of the great float, and for opening and shutting the gates in the said permanent embankment."] I understand the locus in quo to which those clauses relate. The only instructions I received were those that I read yesterday, that I was to prepare plans, with a view to suggesting the best plan for entering the great float. I know nothing of this particular plan I have referred to; those were the instructions upon which I have made my plans, and upon which I have to give evidence here. The public accommodation as regards the public wharf will be provided for by a space equal in capacity, I believe, to what is provided in the original plan. The making of all that forms a part of my estimate, in so far as we alter it to the proposed from the authorised plan. There is a portion of the quay north of the 100 feet passage which I understand is to be devoted to a public wharf. I am not aware that as much as 500,000*l.* was expended by the railway company upon the faith of Mr. Rendel's plans being carried out. The whole reserve, according to my plan, that will be left is about 60½ acres. I know nothing of the amount that has been expended by the railway companies in coming to this station at Birkenhead, or on the rest of the line to Manchester. The Parliamentary estimate does not include the south reserve river wall; its cost would be about 30,000*l.*, a little more than 30,000*l.* [*Mr. Burke* objected that that was not a matter before the Committee. *Mr. Webster* submitted, that it being proposed to make a partial alteration of the authorised plans, he had a right to inquire into the whole effect of that alteration. *Mr. Burke* was heard in reply. *The Chairman* stated, that it being the duty of the Committee to ascertain the completeness of the plan, he thought the information now sought was pertinent to the inquiry.] It was not under my advice clause 49 in the Bill, reserving "a space of not less than 50 feet in width along so much of the sea wall as shall extend from the extreme north-westerly corner thereof, at Seacombe, to the southern extremity of the north reserve, and of not less than 100 feet in width, along the wall from such southern extremity to the intended permanent embankment," was struck out of the Bill; I do not know anything about it. [*Mr. Burke* stated that it was struck out of the Bill by desire of the Crown, being a re-enactment of an old clause to which the Crown objected.] The Corporation have purchased the north reserve; I advised it as being a

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Purchase of north reserve.

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good purchase; that it was necessary to purchase it; I had nothing to do with the value of it; it was 100,000*l.*; it was purchased because they owned all the rest of the property; it was advisable to purchase it; our chairman, Mr. Turner, may have stated that the purchase was necessary because they could not alter the plans without it; I had nothing to do with the purchase from the Crown by Mr. Smith, of whom the Corporation bought; I do not know whether the price was 60,000*l.* I was in partnership with my father in 1844, and he advised the Crown as to the value of the land required for dock purposes; I do not know the amount. The estimate of making the south reserve wall is not included in the estimate, but of course carrying out these works it is an essential feature of them that that must be finished; of course that is a material feature of my estimate for completing the whole works, but not of my deposited estimate. The cost of making that wall when that south reserve shall be made will be—— [*Mr. Burke* objected to the evidence, and was heard in support of his objection. *Mr. Calvert* was heard in support of the evidence on behalf of the Great Western Railway Company, and contended that the Committee could not be put in a position to judge of the propriety of the proposed alterations, unless the whole state of things were gone into; the whole harmony of the original plan might be destroyed; they must be enabled to judge of that. *Mr. Webster* was heard in support of the evidence. *Mr. Burke* was heard in reply. The committee-room was cleared. After some time the counsel and parties were again called in. *The Chairman* stated that the Committee were of opinion that the question could not be put, but that they reserved themselves the right of making such inquiries of this, or of other witnesses, as might enable them to ascertain the character and the expense of the entire plan of the works proposed to be constructed, whether under the provisions of former Acts, or by the present Bill.] The area of the south reserve, supposing my works are sanctioned, will be 60½ acres. The south quay of that intermediate dock is 750 feet long; the total quayage upon that south reserve available for the public, supposing my plan carried out, will be 750 feet of wall and the great float, if you take that which is common to both plans. The quayage upon the authorised plan would be nearly five times that, if you take the whole. The value of the south reserve will not depend upon the extent of quayage it may have; I look upon the great value of the south reserve as a place for docks hereafter. By making docks there the land that would be left would be still more valuable than if you did not make docks there. If Parliament should require that that reserve, if it is altered, should be made into land, the soil would be got from the float; the soil of the float is to go to Mr. Viner's land if the south reserve is not to be filled up. I have not calculated the quantity, assuming that the south reserve is to be made into land, and filled up according to the original project. I do not know whether, upon the authorised plan, the reserves

North and south reserves.

Area and quayage.

Deposit of excavations.

and the works have been adjusted so that the excavations from the low-water basin will about make the reserves. I have not formed any estimate of the cost of making the south reserve into land. The making of the south or north reserve into land is no part of my plan. Assuming the south reserve should be appropriated to docks at some time hereafter, the entrance must be from the river; the plan prepared, according to my report, was for an entrance to the river. I did not propose to lay the sills more than 6 or 8 feet below the Old Dock sill; they would be pretty much the same as they are at the Morpeth Dock, or at Liverpool; I proposed to make that dock much the same as they are at Liverpool—on the Liverpool system; that would reduce Birkenhead to the standard of Liverpool as regards the sills of those docks. I contemplate, if we begin those works, and go on with energy, that they would take from four to five years; I should think the works on Mr. Rendel's authorised plan would take as long. *J. B. Hartley,* 8 May, 1856.

Cross-examined by Mr. Calvert. *Cross-examination.*

I can give the estimate of the works, as I have them here in detail. I have no half-tide basin. I call it an intermediate dock. I set my face against its being called a half-tide basin. I do not admit it to be a half-tide basin at all. The open or river-basin, commencing at the river, is 95,660*l.*; the 100 feet lock, 117,679*l.*; the 28 feet lock, 19,025*l.*; the 50 feet lock, 61,230*l.*; the intermediate dock, 95,672*l.*; the 100 feet passage, 52,364*l.*; the 28 feet inner lock, 21,964*l.*; the 50 feet inner lock, 52,340*l.*; the walling the east end of the float, 15,165*l.*; the 70 feet lock, the alteration from the Egerton Dock into the float, 63,761*l.*; the culverts, 33,471*l.*; the road, that portion of the road we have to alter going to Seacombe, 3555*l.*; the coffer-dam at the entrance, 28,000*l.*; the pumping-engines, 2000*l.*; that will give you a sum total of 679,888*l.*, which, in round numbers, I have called 680,000*l.* The sluices are all mixed up in the other estimate; for instance, the sluices of the basin are included in the cost of the basin. The coffer-dam is to be at the river entrance, outside. I cannot give you the estimate of the sluices, they are so mixed up in the work I cannot give you that; the culverts are intended to bring the water from the large float to the open river-basin; there will be one on each side; they will be 12 feet by 12 feet, circular, arched, and inverts; where the water discharges into the basin will be on an average 15 feet below the Old Dock sill; they will come out of the float as low as we can get them; the centre of them will be about 8 feet below the Old Dock sill. There will be a culvert in the lock, and in each wall in the locks coming out from along the dock; they will be like the veins in your hand; there will be a perfect intricacy of sluices there. The two large culverts will have an area each of 117 square feet. Behind the 50 feet entrance there will be two culverts, 5 feet by 4 feet, which will give you an area of 40 square feet; they will draw water from the intermediate dock. They will all be connected

Details of estimate.

Culverts for sluicing outer basin.

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together one way or another, so that we can either draw directly from the float or from all those places. The area of all the culverts will be 514 square feet; they are all taken in the expense of the other estimates. In the large 100 feet gate there will be three sluices in each gate 6 feet by 3 feet; they will give you an aggregate area of 108 feet. In the 50 feet gate an aggregate area of 48 feet, and in the small gates 24 feet. Those sluices will be 9 feet below the Old Dock sill. The estimate for the culverts, separately, is 33,471*l.* The expense of the sluices enters into the various heads I have given; it will enter into the 1st, the 2nd, the 3rd, and the 4th, the open river basin, the 100 feet lock, the 28 feet lock, the 50 feet lock, the 100 feet passage, the 28 feet passage, and the 50 feet passage. There will be a great many sluice orifices from the culverts into the open basins; I cannot tell you off-hand how many there will be. I have not taken out the area altogether of them; I have only taken out the area of the culverts that will bring water to those openings. I have not taken out the area of the openings. The sluices are all round these walls, and we shall throw out water from a great quantity of openings, and stop it from coming through other openings. The low-water basin includes the pitching of the bottom I have mentioned.

Culverts and sluices.

Conservancy board.

There is a body of persons called the Lords Commissioners of the Conservancy of the River Mersey; they are the First Lord of the Admiralty, the First Commissioner of Woods, and the Chancellor of the Duchy of Lancaster. I have heard that in the year 1851 they directed an inquiry before Mr. Robert Stephenson and Admiral Beaufort respecting the respective plans of Mr. Rendel and Mr. Abernethy. I have seen the Report. (*The following passages were read.*) "The points of inquiry were: 1st. Which of the two plans would be the least expensive in constructing the outer work. 2nd. If carried into effect, which would be the least expensive in working and the easiest of extension. 3rd. Which of the two plans would afford the greatest amount of accommodation to the daily increasing trade and commerce of the port. 4th. With reference to the agreement with the Crown in the Act of last session. In support of Mr. Abernethy's plan, Mr. Stephenson and Admiral Beaufort received the opinions and evidence of Sir John M'Neill, Mr. George Rennie, and Mr. Abernethy, and from Captain Maugham of the London Docks; and in support of Mr. Rendel's plans, from Mr. Rendel, Sir William Cubitt, Mr. Brunel, and Mr. Radford, engineers; and on nautical points from Captain Claxton, Captain Denham, and Captain Rowland. They report in page 12: 1st. That the plan proposed by Mr. Rendel would be least expensive in the construction of the outer works. 2nd. That neither plan has any decided advantage in cost of working or for future extension. 3rd. That the maintenance of a tolerably uniform water-level in the great float, notwithstanding its convenience, is not of very great importance, and has been overrated by those who gave evidence in favour of Mr. Abernethy's alterations of Mr. Rendel's original design. 4th. That the

Report of Admiral Beaufort and Mr. Stephenson.

fluctuation in the water-level would be almost every tide in Mr. Rendel's plan, whereas it would be less frequent in Mr. Abernethy's; but the amount of it, and ultimate extent of depression of level would be nearly identical on both plans, for deepening the float would be the same on one plan as another. 5th. That the cost of loading or unloading goods would not be sensibly increased by a fluctuating level if proper appliances be introduced. 6th. That the evidence is most decidedly in favour of the great convenience and commercial value of the low-water basin. 7th. That Mr. Rendel's design and arrangement for obtaining a universal amount of scouring power through the low-water basin is the most feasible method for keeping it open which has been presented to us. 8th. That whatever advantages a half-tide basin may under certain circumstances afford, such do not exist at Birkenhead for rendering it substantially available. 9th. That the greatest amount of commercial convenience will be afforded by combining the great float (accessible by a common level to be established between it and the tide of the day) with a capacious low-water basin, affording refuge for smaller craft at all times of tide, and being conveniently available for a large portion of the coasting steam trade. 10th. That taking into view the rapid stride now making in the dimensions of first-class steamers, it would be advisable to increase the width of the gates of the large lock entrance into the great float beyond the widths originally proposed by Mr. Rendel. 11th. That having regard to the works which are already so far advanced, it would be highly injudicious to introduce such a radical change in the original project as that proposed by Mr. Abernethy, since all the evidence leads to the conclusion that the expense would be increased, and its usefulness seriously impaired." The parts which are authorised under the existing Acts of Parliament, and which parts it is now proposed to abandon, are—the whole of the walling of the low-water basin—in fact, the whole of the low-water basin features entirely—and to substitute the plan which I have prepared; we shall abandon the whole of the features of the low-water basin, and replace them by what I have proposed. We shall abandon the sluicing suggested by Mr. Rendel; I do not know whether those parts of the plan are praised in that Report as of the greatest importance to the public; we abandon the low-water features altogether. I am aware that in 1852 the plan of Mr. Abernethy and that of Mr. Rendel were brought before a Committee of the House of Commons, and that a very long inquiry took place before that Committee into the merits of the two plans. I am not aware that the plan of Mr. Rendel received the approbation of that Committee; I believe there was no decision come to by the Committee at all about it. I believe the plans were withdrawn. The promoters of the Bill were promoting Mr. Abernethy's plans. I know nothing of their reasons why they withdrew the plan, but they did withdraw it, and after a very long inquiry; I cannot say what engineers they heard in favour of it, because I was not present till towards the end of the

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Parts to be abandoned.

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promoters' case; but they heard Mr. Rendel against it to a very great extent, and his examination had not finished when the case was given up. This is the first time I have ever been concerned with respect to Birkenhead. In 1848, I have no doubt I gave the following evidence: "I think 6 feet is the depth of your deepest sill at Liverpool?—Yes. Is not this as deep as you can maintain them?—Yes. To keep them clear?—Yes. Are you prepared to state as an engineer that that difficulty would exist to the same extent upon the opposite shore?—Yes; they would have as much difficulty in keeping sills lower than that as we shall." I had not then been consulted about Birkenhead—that was in my examination before the Committee on the Liverpool Bill, because I never gave any evidence upon any Birkenhead Bill at all. In 1848 we were before Parliament for a Bill for works at Liverpool. In consequence of the deposits being of a lighter character and rather more easy to remove on the Birkenhead shore than the Liverpool shore, I have ventured to place the outer sills as low as 12 feet. The great difficulty we find at Liverpool is this: our docks are excavated to 9 feet below the Old Dock sill, our platforms are generally laid about 6 inches above that—and our sills are 2 feet 6 inches above that—6 and 3 make 9; the difficulty we find is the mud rising on to our platforms. I propose here to make my platform deeper, to lie much more below the sills than we have hitherto been in the habit of doing, and to keep the segments on which the gates travel considerably above the platform, and to put sluices in the face of the sills. The silt generally collects just inside the gates of our docks. There exists at Birkenhead the same difficulty which we have to contend with in our docks at Liverpool; for instance, there is a pair of reverse gates at Morpeth Dock, and I have had to send men over to attend to those gates, the same as we have to do at Liverpool; and there is a great deal of mud in the Morpeth Dock. I did not analyse it sufficiently to see if there was any sand in it; but it was chiefly mud. I know by sight the sort of sand which collects in the Liverpool basins. I found that sand in the Woodside Basin; but did not find any in the Morpeth Dock of a similar character to what we get in the inner docks at Liverpool. The sill is limited to 12 feet, because I think it is as far down as it is safe to go; that conclusion is founded upon my experience; I think it is as low down as is necessary, and therefore as low down as I would wish to go; every foot we go down we decrease the safety. I arrive at the level of 12 feet because at a neap tide of 9 feet we should have 21 feet of water, and that is as deep as almost the whole of the ships, with the exception of 85, that ever came into Liverpool, require. I have gone down as low as is right and necessary to accommodate the ships to be accommodated; I would not go down to 12 feet if I could accommodate the trade without it. To be at a thoroughly safe level, I would not go down lower than a depth at which I could get to my sills at low-water spring tides. If we could have gone down with safety lower than that, we should have done it at

Deposit in Liverpool Docks.

Liverpool long since. I do not think there is such a difference as is supposed between the Birkenhead and the Liverpool side of the river; you will have a lighter description of material to deal with, but I do not think it is safe to go down lower than you can get at the gates. I cannot estimate the difference by any figure between the two sides, but it is not so much as has been said. In spite of that, I recommended the Liverpool Corporation to go down to 12 feet in the case of the 50 feet lock; in the other I recommended 10 feet; but they increased it. New ships are building every day; of course, if the tendency was to increase the draught, those new ships would be increased in draught; but I do not think it is so. There is one ship which is being built of an extreme depth, but I do not know of any other—the Great Mammoth; that is to draw 27 feet, I understand. I cannot say whether the regular line of Atlantic ships are not built of the greatest draught that can be accommodated in our docks; there are, no doubt, ships coming to us from all parts of the world: I have given you the draught of those ships, including steamers. Ships coming from all parts of the world have to wait for tides to get into the Liverpool Docks; they have not often to wait for ten days or a fortnight to get in; there may be cases of waiting several days; steamers, appointed to start on fixed days, are on account of the want of depth of water on the sill sometimes obliged to come out several days before. The 85 ships I mentioned yesterday of draught too deep to come in over those sills must wait till they can get in; but then you must remember I gave it thus, that there were 85 ships which could not get in on a 9 feet tide. Now we have not a 9 feet tide in all this year. I gave that as a very extreme case. I gave you all I could give you. The means we adopt at the Clarence Dock to keep the sills clear are the means we use at every other dock; that is, we have men scraping and cleansing within the gates, and we are compelled very often to let that dock dry to cleanse it, and the dredger is working at it more than at any other dock in the port. It is used more as a half-tide basin than the others. The average neap tides are 11 feet 3. I went down as low as 9 feet. I believe the tides do flow a little higher than the tables give; but the marine surveyor will be able to give you that correctly, because he has charge of the tide-gauges; however, it is only inches if it is anything; it is very little.

J. B. Hartley, 8 May, 1856.

Draught of ships not on the increase.

Tides in the Mersey.

Monday, 19th May, 1856.

J. B. Hartley, 19 May, 1856.

John Bernard Hartley, further cross-examined by Mr. Calvert.

The centre lock—the small lock—is for small craft; there is a very large business transacted in the Mersey in flats or river craft; I have no means of knowing how many of those small craft go in and out of the Liverpool Docks in a tide. I am not aware whether the harbour master could get it from the returns of the dock master's books; I have not been guided in my arrangement of these docks by any statement of the number in respect of that craft. When the Birkenhead Docks are established, I cannot tell what will be the proportion of the trade that will pass away by the railways as compared with the proportions that will pass away by any other means. I have no means of knowing that; I have not taken it into consideration. I presume rails will be laid along the margin of the docks, all communicating with the present railway to Birkenhead. In making that plan I have not contemplated that there would be very much commercial business done in the intermediate dock; I do not contemplate it will be so. I intend it merely as an entrance; if there is much commercial traffic to be done it could not be done by the intermediate basin. I presume the traffic that is sent away by water will be sent away in the same manner as the similar traffic on the Liverpool side: take, for instance, the carrying company at either of the docks near the warehouses—they will take the goods from the different warehouses, load them into the flats, and send them away into the country. My instructions are the only things I have given especial attention to, which were to get the best access from the river into the float, the float being the place for business. But whether the railways shall receive their goods from the outer basin, the intermediate basin, or the great float, I have not given any consideration to; but it is obvious that the intermediate dock would not be appropriated for that purpose. On the Cheshire side of the water there will be, according to my plan, only three entrances; just the same as Mr. Rendel's; three, besides the Morpeth Dock entrance. At Liverpool we have eighteen entrances; the inconvenience will not be greater here than at Liverpool. The greater portion of the traffic you are speaking of now at Liverpool comes to the docks especially provided for it—some to the Duke's Docks, and the carrying docks, the Manchester Docks. There is river traffic going out of all of them, but not in that mass there is out of the others; they will be coming out before the big ships are beginning to stir—that you cannot do at Liverpool. The great majority of the goods coming into the port of Liverpool are landed at the quay, and warehoused, or perhaps carried away from the wharf. I believe the exception will be

Traffic into the interior.

a ship discharging her goods into vessels in the float. I do not presume the vessels will lie in the float and discharge into lighters; but I have not taken the matter into consideration. The passenger traffic must go to the Woodside Ferry, which has a special right; they will not be allowed anywhere else. Two vessels going into my intermediate dock could do it just as readily as two vessels could go into Mr. Rendel's low-water basin. Four vessels could go into Mr. Rendel's low-water basin when the four could not go into mine, abreast of each other; I do not think they would try it. I do not come here to condemn Mr. Rendel's plan; I come here to say that the plan I have prepared is better adapted for the trade than Mr. Rendel's. I did not inquire whether Mr. Rendel's plan was adopted at Boulogne, Ostend, and Dunkirk; I never inquired where it was adopted; I know that Mr. Rendel said it was an entirely new experiment, that nothing of the kind had been done before. It is quite different at Hartlepool; they have a bar at Hartlepool; when they have three feet of water upon it they can remove it by means of sluices; if they have four feet of water they tell me they cannot remove it at all. The water comes out of a larger area within, and runs through the channel confined within the piers, and when it gets to the end of the piers it meets the bar, and affects it to a certain extent. I propose to excavate the intermediate basin in the first instance to 18 feet below the Old Dock sill, and keep it so if we can by dredging. I have not calculated the amount of deposit we shall have there in the course of a year to remove; I have not calculated what would be the expense; I think that it will be pretty much upon a par with the Liverpool Docks. The Liverpool Docks, upon the average, cost us 44*l.* 16s. 9d. per acre; they cost us more at the south than the north. The extreme is the half-tide basins; they cost us a great deal more; about 150*l.* an acre, rather better. The smallest is 20*l.*; they are the northern docks; they were opened, I think, about 1848. I have no horns at the extremity of my piers; it has never been any part of my plan to have horns; they would not increase the facility of getting large ships in and out; it would be very much the other way; they would not shorten the length of our warps; in fact, you would have more difficulty in getting in with horns than without them. I should think 99 out of 100 of the large ships at Liverpool are docked by tug; with horns you would have a shorter distance to carry the warp. We have horns at Liverpool, because it is a lee shore; they are put there for shelter; with the wind from the east the Cheshire would be the lee shore; but the winds from the east are always very light; we never have a gale of wind from the east that we feel in the Mersey. The balance of disadvantage would be far greater than of advantage that would arise from them; the basins would be much more of sand-traps with horns than without them. The bar would be immediately between the horns; but if the bar were thrown out, I expect that when the south wall is finished anything immediately outside the river wall will be scoured away. The bar would be within the line of the river wall;

J. B. Hartley, 19 May, 1856.

Cost of dredging docks at Liverpool.

J. B. Hartley, 19 May, 1856.

if you put horns there the bar would be within the horns. Immediately between the horns there would be a bank. The paving of the entrance basin would not render it almost impossible to dredge; you could not anchor upon it; the anchor would drag unless there was an accumulation of mud upon it; they might ground upon it, the same as they might ground upon any bottom which was perfectly straight and level. Injury would result to a ship bearing hard upon the middle, and not supported at either end; but, suppose she is upon the flat bottom, I believe she is as good upon the pavement as when she was upon the stocks upon which she was built. There would be a liability to injury at the spot where the flooring terminates if she grounded partly upon it, if they chose to place their ships there, which they would not. I do not propose any means for keeping the outer basin clear besides the sluicing, the dredging and the dummies to be sunk when required; I think those will be sufficient. The cost of the paving is considerable; there will be advantages to counterbalance the expense of building it; a better surface to sluice upon, and a fixed bottom; the estimate for the pavement is included in the other. Without that pavement there, the sluicing would not tear up the bottom; it would brush away the stuff immediately within its influence, which would rise in a lump gradually as the force died away; if I had no sluices there, I should not require any paving.

Paving outer basin.

Length of wall and entrances at Liverpool.

The extreme length of the river wall at present of the Liverpool Docks is 5 miles and 20 yards; the whole length over which those entrances extend is 4½ miles in round numbers. I cannot say what is the whole length of entrance; adding all the entrances together; there are eighteen entrances, and they vary from 70 feet to 40. There are three entrances into the basins, which you would have to take off that; of the eighteen entrances I give you, some of them open out of those basins. I cannot give the actual entrance into the river, whether into the basins or not, without taking it out. It will take some time to get out; I cannot give it you to-day. I only heard of Mr. Rendel's low-water basin being a harbour of refuge in the evidence given before the Committee; it was called the harbour of refuge by the promoters. If I am not mistaken, it was from Mr. Rendel I first heard it. At the time a harbour of refuge is required at Liverpool, if it is necessary at all, which I say it is not, you could not use it without steam. It is possible I may have said there is damage to vessels lying at anchor in the river, and that there is a great desire to provide a place of refuge for them, in my evidence in 1848 on the Liverpool Dock Bill, before Mr. Abernethy as the surveying officer; I do not remember it. There is a great desire to provide a place of refuge for them; there is no doubt of that; if a ship can get into dock, she will not lie in the river; the low-water basin is a place of refuge. Nothing has been done in the twelve months since the Liverpool Dock Committee got possession of the Birkenhead Docks, but keeping what is built in repair. The

Harbour of refuge.

Corporation are now upon the eve of letting the contract for deepening the inner float, I believe. I did not recommend the Corporation to lose those twelve months; I never recommended the Corporation to do anything of the kind; I have given no recommendation of that kind to the Corporation; I had nothing to do with that; my instructions were to report to them, as I have stated before. There are parts of the works that might have been gone on with, no doubt—the river wall for instance; but, with that exception, I do not see that there is any portion of those works which could have been gone on with. The landing-stage operation at Liverpool is shown upon the plan; the stage in course of construction is in front of the Prince's Dock; it will be 1000 feet long, and 80 feet wide; its distance from the entrance to Prince's Dock is from 1000 to 1200 feet. There is a great traffic into Prince's Dock; I do not think the landing-stage at that spot will interfere with the traffic in and out of the Prince's Dock. The chief traffic into the Prince's Dock is through the Prince's Basin; it will interfere, if it interferes at all, with the traffic into George's Basin, but the present stage has not been found to interfere with the traffic. In proposing these plans for the Birkenhead Docks, I contemplate the same description of traffic generally as goes into the Liverpool Docks; if we do not go on increasing our docks at Liverpool, of course all the increase must go to Birkenhead; I mean that the docks at Liverpool will only receive what there is at the present time; if there is no increase at all, I think it is very probable that there will be a traffic induced to Birkenhead from the facilities offered, if the plans are carried out, of getting access earlier by the sills being made deeper. I cannot at all tell how many ships in the course of a year are likely by reason of that to prefer Birkenhead to Liverpool, because many vessels would rather wait for water to go into the Liverpool Docks than they would go to Birkenhead, the interest of their owners being upon that side of the water. During the last week a great number of vessels have, as I am told, been neaped; the tides have not been high enough to take them into the docks; it is a very common occurrence. In considering the plans for Birkenhead I did not consult with any other engineer in the first instance; I proposed the plans without consulting any other engineer; the Dock Committee, when they communicate with any other engineer, have always done it with my knowledge. There have been no communications with any other engineers to advise the Dock Committee as to those plans at all; other engineers have been asked whether they would support those plans before Parliament. The engineers consulted—[*Mr. Burke* objected to the question. *Mr. Calvert* was heard in support of the question. *Mr. Burke* was heard in reply. *The Chairman* stated that the Committee were of opinion that the names should be given of any engineers who had been consulted, but that with regard to anything that might have passed with them the Committee did not think it ought to be stated.]—on the part of the Cor-

J. B. Hartley, 19 May, 1856.

Landing-stage.

Trade to Birkenhead or Liverpool.

J. B. Hartley, 19 May, 1856.

poration were Sir William Cubitt, Sir John M'Neill, Mr. Rennie, Mr. Abernethy, Mr. Harrison, Mr. Murray, Mr. Hawkshaw, and Mr. Hawkesley. I said the Dock Committee consulted no engineer without my knowing it. The Corporation are quite distinct from the Dock Committee. The plans included in the Bill of 1855 would have provided for a very great increase of trade; Birkenhead did not enter into the consideration at all, and we had nothing to do with it; we never considered Birkenhead then; Birkenhead had its own plans, and was making its own improvements; we were providing for Liverpool; we thought the plans we laid down were sufficient for any increase in the Liverpool traffic that was likely to come for many years. The greatest depth of sill intended then at Liverpool was eight feet below datum. By the Bill of last year, it was proposed to raise the sum of three millions and a half for the purposes then contemplated on the Liverpool shore; about a million of that was to be appropriated to the erection of warehouses; other portions for the purchase of land from time to time, as it might be required; the object was not to spend it all off at once: the object was to design a plan that might be carried out piecemeal, as the trade required it; and in that plan there was a certain kind of accommodation to be given which is very much required, and which this float will also give, accommodating the trade which required a water-frontage, and which we have no means at present of accommodating. We had then in contemplation works for accommodating the anticipated trade of Liverpool; there was no exclusion of anything that Birkenhead might do at the same time, if it thought fit. Parliament interfered, and compelled Liverpool to become the owners of Birkenhead; they would not give the Liverpool Dock Trustees more money than sufficient to go on with what they must do. It now becomes the interest of the Corporation of Liverpool, being owners of Birkenhead, to accommodate the trade of Birkenhead, which has not accommodation at Liverpool. I believe the Corporation have given for the Birkenhead Docks 1,100,000*l*. It will be the interest of the Corporation of Liverpool to make their outlay as profitable as they can. The proposed works at Birkenhead will afford accommodation for a larger class of vessels earlier in the tide; it will also afford a larger accommodation in another way: though we shall have as large a lock on the Liverpool side as we should have there, still that has only access to a certain limited quantity of dock surface, whereas those entrances at Birkenhead affect the whole of that large area. The landing-stage already existing at Liverpool is under the management of the Dock Committee; the one constructing will belong to the Corporation; I presume it will be under Corporation management; it would afford adequate accommodation for the large-class steamers—coasting steamers. A similar accommodation on the Birkenhead shore would be perfectly practicable; it could just as readily be done upon the Birkenhead shore as on the Liverpool shore; such a landing-stage would project out into deep

Birkenhead not considered in Bill of 1855.

Landing-stages at Liverpool and Birkenhead.

water; they could get as good water there close to the shore as we could. Until the south reserve is wanted for docks, it could be placed immediately opposite the south reserve. If the south reserve were wanted for dock entrances, I should put the landing-stage where the Woodside Basin is now, and fill it partially up; that could be done without interfering with the entrance to the Morpeth Dock. The Woodside Basin was originally contemplated as a place for coasting vessels to beach; I believe it is not used for that purpose. The landing-stage would occupy of course so much of that beach, which is, however, very slightly used now by coasters; looking at the extent to which it is used, I think there would not be any serious inconvenience arise to those vessels by having that space so occupied; I think the convenience would counterbalance the inconvenience. I should fill up about that much of the Woodside Basin, making a passage up here to the Morpeth Dock, and then put the landing-stage right in front; that would enable the railway company to come upon this ground (*pointing out the same*). The only communication that the railways have now with the trade of the Mersey, is, so far as the Cheshire Junction Company is concerned, up to the float; and, so far as the Great Western Company is concerned, to the Morpeth Dock, across this bridge, which must be open at all times when vessels are going through; that is an interruption to any fixed time of departure or arrival. If a portion of the Woodside Basin were appropriated in the manner stated, the Great Western and the Cheshire Junction rails could be laid down in connexion with the landing-stage there; I see no difficulty at all in their coming down here. By that means the railway companies would get an access, as they have now, to the float, to the Morpeth Dock, and to the shores of the Mersey, and to the great landing-stage you would make there; they would have this advantage, which they would not have at the south reserve—they would be able to come here at any time they liked. A ship would come more readily to the landing-stage here than to the slip in the low-water basin. At 220 feet from the line of the river wall which would be built, there are 32, 33—33 down to 23 feet—23 feet is the shallowest I see: 23 feet at the south end is the least water, and 33 feet at the north end is the greatest water at 220 feet from the wharfage, according to these soundings. We have had no vessel ever enter the Mersey, that I have been able to find yet, which has drawn more than 24 feet water, and we have there a maximum of 33 feet. Mr. Brunel's big ship, I am told, is to draw 27 feet when loaded; even she, if she came to the Mersey, might meet depth of water enough to lie off the pier with a stage of that kind. In the basin contemplated by Mr. Rendel there would be 12 feet at low-water spring tides—these are spring tides I see too—that would be utterly inadequate for any large vessel to lie in. The evidence referred to in 1848, put into my hands, had no reference to a harbour of refuge, it was as to a means of refuge for vessels from the river, which of course a dock is; as to a

J. B. Hartley, 19 May, 1856.

Proposed alterations in Woodside Basin.

Landing-stage and station for railways.

Soundings off south reserve wall.

J. B. Hartley, 19 May, 1856.

harbour of refuge, the Sloyne is the best place in the Mersey for vessels to lie; it is the best anchorage ground; vessels can get there with great ease, and lie in safety when it is blowing heavily. As a question of safety, there is no necessity for a harbour of refuge in the Mersey at all; large steamers can lie there when they cannot get into the dock. This low-water basin of Mr. Rendel's could not be used for the purpose of safety as a harbour of refuge if required, looking at the prevailing wind there; as I said before, the time when a harbour of refuge is required at all is when it is blowing hard, and our prevailing gales are from the west to the north-west, and a vessel could not then get in without steam; she could not run in under sail with the wind from the westward. The easterly winds we have at Liverpool are slight winds; we never have a gale of wind from the east that we feel at all; when an easterly gale is felt at Dublin, we do not feel it in the Mersey at all. For the purpose of protection, horns on the Birkenhead side are totally unnecessary; I was very glad to be able to do without them; for the purpose of warping they are not necessary; they are a nuisance when not necessary; Liverpool is a lee and Birkenhead a weather shore.

Shelter in Mersey and low-water basin.

The Chairman stated that the Committee, in explanation of the 12th and 13th sections of this Bill, would wish to know the entire plan of the Corporation with reference to their obligations under those two sections, because, in the 12th section, they undertake to construct the new works agreeably to the deposited plan, and the 13th section says, "The Corporation may and shall construct and complete, so far as they are at present unconstructed or incomplete, all such parts of the docks and works heretofore authorised as shall not be affected by the said new and altered works, and may and shall continue and maintain," &c. Now the Committee would wish to have a statement of what is proposed to be done in that respect—what are the works heretofore authorised not altered by your present plans, and what are the works that it is proposed to construct under the obligations of that 13th section; they wish to know the entire plan of the Corporation. The docks which have recently been mentioned to the Committee that may possibly be constructed in the south reserve are different matters; but there are the walls of the two reserves, and there are also other portions of the plans heretofore authorised which the Corporation acknowledge their obligation to complete. The Committee must know the entire plan, comprehending the new plans, and the portions of the plans unaltered; they must have it as a whole, detailing the works and particulars, without binding the Corporation to very great accuracy of details; therefore the Committee did not permit the cross-examination of counsel upon that subject. For their own information, the Committee must know the entire plans of the Corporation, as well the new plans as what the Corporation will be bound to construct of the old.

Tuesday, 20th May, 1856.

John Bernard Hartley, examined by the Committee.

J. B. Hartley, 20 May, 1856.

I am prepared with the statement which the Committee requested me to provide, and I have prepared plans (*delivering in the same*). The money to be raised under the Act of last session was 500,000*l.*, and the money proposed to be raised under the Act now sought for is 450,000*l.*, making together 950,000*l.*; the money to be expended under the existing Acts, deepening the great float 30 acres at the east end to 10 feet below the Old Dock sill, and the remainder to 8 feet below that datum, 138,000*l.*; walling the north side of the float as by Mr. Rendel's estimate, 120,000*l.*,—that is, the yellow part, less walling already done 39,739*l.*, and the Corporation walls, which they would have had to pay for, even if they had not got this Act, 25,000*l.*; leaving 55,261*l.* to be spent upon the walls; giving 193,261*l.* for the deepening of the float and the walling of it. Then there is the removal of the large dam between the great float and the outer works, 5000*l.*; that is the temporary dam now existing. The road from Birkenhead to Seacombe, that portion not included in the Parliamentary estimate, 4232*l.*; sewerage and culverts at Seacombe, as by Mr. Rendel's estimate, 8858*l.*; completion of the south river wall of the south reserve, 30,668*l.*, making a total of 242,019*l.*; works to be made under the Bill now before Parliament, 680,000*l.*, all coloured pink upon the plan; leaving 27,981*l.* out of the 950,000*l.* for the cost of the Act and contingencies of different kinds.

Monies to be raised and expended.

James Abernethy, examined by Mr. Merewether.

J. Abernethy, 20 May, 1856.

I am a civil engineer, and have turned my attention particularly to the formation of docks and harbour works, and have had works at Birkenhead, Aberdeen, Blythe in Northumberland, Swansea in South Wales, Newport in Monmouthshire, Stranraer on the west coast of Scotland, Silloth Bay in Cumberland; and I am also consulted in various works, and, amongst the rest, Port Adelaide in Australia. I have been for several years past well acquainted with Birkenhead Docks and works; during the years 1851 and 1852 I held the situation of engineer-in-chief; the map on the wall bearing my name shows the plan which I proposed at the time. In the Parliamentary session of the year 1852, the Trustees of the docks desired to make an alteration in the existing plans according to those designs. The principal feature of that alteration as designed was the substitution of an outer lock or half-tide

J. Abernethy, 20 May, 1856.

basin between the great float and the Mersey, in place of the great low-water basin proposed by Mr. Rendel; that describes shortly the difference between the main feature of my plan and of Mr. Rendel's. There was a preliminary inquiry on the comparative merits directed by the Conservancy Board of the Mersey, by Admiral Beaufort and Mr. Robert Stephenson. After that, in the Session of 1852, the Trustees applied to Parliament for the purpose of authorising my amended scheme; there was a long Parliamentary contest, and it was far into the session; time was wearing on; and, in fact, it was obvious that we should be beaten by time, and the Trustees, on my advice, and by my consent, withdrew the clauses regarding the works; but there was not time for the Bill, denuded of the complicated question of the works, before the close of the session. During the last four years I have made repeated visits to Birkenhead; during the years 1851 and 1852 I was engineer-in-chief at Birkenhead; since then I have been carrying on docks for the Corporation of Liverpool at Birkenhead, and have had occasion to visit Birkenhead repeatedly. The only work that has been executed since I ceased to be engineer in 1852, is the prolongation of the north reserve wall, and the construction of the coffer-dam shown upon that plan, there lettered "temporary dam." That temporary dam has, I think, no reference to any work to be completed; it is merely an earthen dam,—a temporary dam. The water was admitted to the float under my direction; it has since been worked as a great dock, at nearly a permanent level. There will be some slight fluctuation, probably from 1 to 2 feet, occasionally, arising from the absorption of water on the passage of vessels through the Morpeth Dock. The only existing entrance into that which we still call the float is the Morpeth Dock; taking what may be fairly anticipated as the trade of Birkenhead, that one entrance would not be in the slightest degree adequate to the trade that may be expected. It is absolutely necessary that something should be done in the way of additional entrances; at present you have a great dock with a very inefficient entrance. I have made myself acquainted with the plan proposed by Mr. Hartley for the additional entrances; as compared with Mr. Rendel's plan, there are some features of Mr. Hartley's plan in common with the alterations I proposed to make in Mr. Rendel's; Mr. Hartley has placed an intermediate dock between the great float and the river Mersey, and the only difference between that plan and the plan proposed in 1852, is the substitution of locks instead of single gates. My entrance-basin was 8 acres; that represents less space of water than the low-water basin of Mr. Rendel, as 8 is to 27; Mr. Hartley has further diminished the extent of the entrance-basin; I was led to make that change in Mr. Rendel's plan from the fact, that the great float had to be treated not as a highway, as originally intended, looking to docks to be hereafter built upon the margin, but as being in itself a great dock; I thought it necessary to provide the proper entrances for a dock; and I

Plan and proceedings in 1852.

Entrances to the float.

also had strong doubts as to the possibility of maintaining and keeping open that great low-water basin; and commercially, I also think a half-tide basin, or intermediate dock, is to be preferred. Mr. Rendel's plans have been changed at different periods very materially, and I think the effect of those changes is to assimilate the great float more to the character of a dock, and gradually to lessen the importance of the great low-water basin. I do not think that the great low-water basin can be maintained at the depth Mr. Rendel proposes. I think, taking into account the fact that there would be a minimum depth of 12 feet in that great low-water basin at spring tides, and that the waters of the Mersey are so heavily charged with sand, and that the entrance to the great float is such a distance from the mouth of the basin, that it would not be possible, by any system of sluicing, to maintain that great low-water basin at the depth proposed. I know of no parallel instance of sluicing similar to that. I think that 12 feet depth of water would render the sluicing power inoperative there; because I think the effect of discharging a body of water, as proposed, 2 feet above the bottom of that basin, and having a depth of 10 feet of still water above that, would be, that the water passing out of the sluices, meeting with the resistance of the still water in the basin, would rise to the surface, and pass off in a succession of waves, without creating the necessary under current. In order to keep open that great low-water basin, Mr. Rendel has always stated it would be necessary to create an outgoing current of 2½ miles an hour as the minimum, and in order to do that again, to discharge a volume of water stated to be equivalent to about 1,600,000 cubic yards. Now to furnish that quantity of water would require about a 20-foot tide over the Old Dock sill; the available water being the difference between the 20 and 13 feet. I do not believe that water would be effective over that surface as a disturbing power, even if the water could be had. I think the effect would be to remove the deposit from the immediate vicinity of the sluices, and to create a bank, particularly at the junction of the two forks. According to Mr. Rendel's own evidence, it would be necessary to carry on the scouring process daily to remove the accretion that will necessarily take place. The quantity of water I have given is equivalent to a 20-feet tide, and that tide only occurs 20 days this year; that is, 40 tides. Taking the mean of the tides this year, the height above the Old Dock sill is 14 feet 9½ inches, and assuming the 13 feet level, Mr. Rendel would only have available for sluicing 1 foot 9. Assuming the area of the basin to be 27 acres, and the depth to be 12 feet, there would be 538,720 cubic yards of water in the basin; and taking the area of the float at 150 acres, and running it down from the 14 feet 9½ level to the 13 feet, there would be available for sluicing 433,583 cubic yards; that would be the whole quantity of water to be discharged; the whole quantity of water to be discharged being less in volume than the quantity of dead water in the low-water basin. It is also to be borne in

J. Abernethy, 20 May, 1856.

Maintenance of low-water basin.

J. Abernethy, 20 May, 1856.

mind that there are this year 107 days, that is, 214 tides in which the tide does not rise to 13 feet; and when, therefore, no water can be available for sluicing. Mr. Stephenson and Admiral Beaufort say in their Report (at p. 11, near the bottom of the page): "Beyond the entrance where the artificial currents blend with the river waters its velocity will be partially neutralised, and an accumulation of sand forming a bar will undoubtedly take place. The extent of this accumulation cannot at present be determined; but that it will require to be removed by some other disturbing agency in addition to the sluicing current must be anticipated. This bar, assuming both entrances to be made of the same width, would most probably be less in extent upon Mr. Abernethy's than Mr. Rendel's plan, owing to the length of the area in front of the outer gates being to some extent within the direct action of the sluices. We do not believe it practicable to make any precise estimate of the relative merits of the two plans, as respects the formation of the bar. In both it must take place, but the difference cannot be determined from any data in our possession. It is, however, sufficient for our present purpose to state an opinion, that in this respect, upon principle, the two plans do not appear to differ in any important degree, assuming, as we have before done, the entrances to be of the same width." I agree with these gentlemen, that the probability of a bar is common to almost every plan; the important thing is to devise the best, the easiest, and most probable means of dealing with that accumulation; the nearest sluice upon Mr. Rendel's plan is about 2000 feet from the entrance; I think those sluices operating at the distance of 2000 feet from the bar, would be wholly inoperative as regards removing the bar, but that they would dip up from near themselves further deposit to add to that bar. Sluicing is practised at various ports with greater or less success according to the circumstances; but I know of no parallel instance to the case of Birkenhead. Hartlepool is not a parallel case; because Hartlepool and some other similar ports are simply river currents or artificial currents passing over a dry bed, with no opposing matter to resist its action except the friction over the bed; there are instances of currents passing over inclined beds; this is the case of discharging a body of water into a full trough having a level bottom and a minimum depth of 12 feet of still water to contend with. The water is penned up at the head of Boulogne harbour, and on certain occasions at dead low water it is allowed to flow in a current through the harbour and out to sea. There is no analogous case, so far as I am aware, to Mr. Rendel's low-water basin. Silt and sand is held longest in suspension, in water in an agitated condition; in still water it will deposit more quickly. The heavier portions of the deposit in the great low-water basin would be at the mouth, the sand would deposit first; the silt and the light matter would deposit at the head of the basin.

Effect and operation of sluicing.

Variation of level in low-water basin.

The low-water basin will have a variation of level to the extent of 27 feet at ordinary spring tides; that would be extremely inconvenient in

discharging cargoes; there must be a great alteration in ships' moorings. For transit steamers—contrasting the two plans, Mr. Rendel's and Mr. Hartley's—there is more accommodation in Mr. Hartley's plan than in Mr. Rendel's, inasmuch as on the south side of his outer dock there is a length of wharf of 750 feet, clear of the entrances into the float, available for wharfage. In Mr. Rendel's plan it is obvious that if any large traffic is passed through his great lock, it will block up and prevent access to the Birkenhead fork from the great low-water basin. I apprehend that for the 107 days, taking this year as the average, during which the tide does not rise to 13 feet level, all the traffic will have to be passed into the great float by a single lock, with any aid it may get from the Morpeth Dock. Of course there is that entrance available to a certain extent. Mr. Hartley has a little increased upon my entrances. I think that, during spring tides, it would be exceedingly inconvenient to pass vessels into the great float through a single pair of gates, from the rapid in-going current which will necessarily take place; and during neap tides which fall below the 13 feet level, there is but one lock provided for the whole of the traffic. I think there is great risk in trusting a great dock of 150 acres to the stability of a single pair of gates; and I think all persons who consider the subject must allow there is a manifest advantage in Mr. Hartley's plan over Mr. Rendel's in that respect. There would be a very great risk in any vessel attempting to enter that great low-water basin under way, with other vessels lying in the basin. Mr. Hartley has provided locks as one of his modes of entrance; that appears to me expedient; it provides additional safety. According to Mr. Rendel's plan, there would be a large admission of tidal water into the float; I believe the heavier portions of the deposit, say of sand, would be deposited in the great low-water basin, but that the lighter portion of the deposit would also pass into the great float; I think the consequence would be the gradual silting up of the great float, and a very great deal of expensive dredging to maintain it; and that is a very serious drawback. I think the quantity required by Mr. Hartley's plan of tidal water to pass into the great float being limited, the deposit would be considerably less: if deposited, it would be deposited in places where it would be more handy to be got at than if dispersed in the great float.

J. Abernethy, 20 May, 1856.

Insufficiency of single lock and gates.

Deposit of different materials.

Cross-examined by Mr. Webster.

Cross-examination.

I was employed in 1847 as the surveying officer of the Admiralty under the Preliminary Inquiries Act. On that occasion I received a good deal of evidence upon the Birkenhead Docks with regard to legalising the Morpeth Dock, which had been made without the authority of an Act of Parliament. On that occasion I believe I reported to their Lordships that the Woodside Basin was a necessary part of the scheme; I do not remember the report. It was at the time made an objection to the legalising of the Morpeth Dock that it would

Admiralty survey in 1847.

J. Abernethy, 20 May, 1856.

interfere with the coasters in the Woodside Basin. The Woodside Basin is dry at low water. I believe it was provided as a substitute for the former beaching-ground of Wallasey Pool; whether at the instance of the Liverpool parties I am not aware; I think it was the Commissioners of Birkenhead. I do not remember that in 1848 the Corporation of Liverpool objected to the use of the Woodside Basin as a passage to the Morpeth Dock, on the ground of the inconvenience that it would subject the vessels to for whose accommodation it was provided; I am not aware that they petitioned against it upon that ground. As the surveying officer of the Admiralty, I made a report, which was published as a Parliamentary paper; I also reported the evidence received on that occasion; it was very extensive; it occupied some space. I had inspected, and I described the works which were authorised under the Acts of 1844 and 1845. I reported upon the works authorised by the Acts of 1844 and 1845 in these words:—"The combined works authorised by these two Acts (the Acts of 1844 and 1845) formed a gigantic and well-arranged plan, all the parts of which are dependent upon the other, perfect as whole, imperfect if taken in part. First, the great low-water basin is necessary as an entrance channel to the great float of Wallasey Pool. Secondly, the great low-water basin is dependent upon the pent-up water of the great float to keep it open. Thirdly, the great low-water basin, being simply an entrance channel kept open by sluicing, is inconvenient for the coasting trade. The Woodside Tidal Basin is therefore a necessary part of the great whole. A plan so well arranged, I am humbly of opinion, deserved Legislative sanction;"—but that expression of opinion applies to the original plan. The great float, originally designed by Mr. Rendel, was to form, as it were, a branch river or highway, leading to docks yet to be formed upon the margin. The expression of opinion which I gave was with reference to that plan. I did then report in those terms to their Lordships. The low-water basin is a feature in all the plans from 1844 to the present time, but there is a very considerable departure as regards the great float itself. A low-water basin, substantially the same, although altered a little in dimensions, is no doubt a feature of all the plans. I was reporting to the Tidal Harbour Board of the Admiralty; this is the plan accompanying my report to the Admiralty in 1847. My business was to report upon the Morpeth Dock. I did not express an opinion upon the plan as a whole. That was the plan as to which I said: "The Woodside Tidal Basin is therefore a necessary part of the great whole. A plan so well arranged, I am humbly of opinion, deserved Legislative sanction. The scheme as originally designed was a noble one." I again reported to the Lords of the Admiralty in 1848. At that time I reported on the necessity of proceeding at once, in these words: "The necessity that exists, in my opinion, in order to save the whole scheme from ruin, of proceeding at once to the completion of the works of the great float and tidal basin, renders it inexpedient at the present time to expend any money on

Report of 1847.

Report of 1848.

warehouses, or similar permanent buildings, and no such powers should be granted." In 1850, in conjunction with Mr. Lawes, I took evidence on the Birkenhead question, and then reported, in conjunction with him, in these words: "The main works, viz., the great low-water basin and the passages therefrom from Wallasey Pool are completely suspended, and the basin itself has considerably silted up. Under these circumstances, we think, there is reason to fear that if the period for the completion of the main works be enlarged for 10 years, according to the provisions of the present Bill, with permission to use the Egerton and Morpeth Docks as entrances to the Wallasey Pool, the result may be an indefinite postponement of the execution of the original design." At that time it was illegal to use the Woodside Basin as an entrance to the Morpeth Dock, excepting for a temporary period. At the time when this question of allowing the Woodside Basin to be used as an entrance to the Morpeth Dock arose, I had had no employment by the local parties at Birkenhead. My employment up to that time had been by the Lords of the Admiralty, to whom I made those three reports. Shortly after that I became employed by the local parties. After I ceased to be a public officer, I prepared a plan, bearing date in 1850, for the appropriation of the site of the low-water basin. My report to the Lords of the Admiralty containing the last paragraph was on the 27th of April, 1850. In the autumn of that year I became employed by the local parties. On the 14th of December of that year I prepared a plan for the local parties, by which I proposed to build a wall across the Birkenhead fork of the low-water basin, so as to reserve only that entrance straight out to the Mersey. There was a great difference in the estimates of Sir William Cubitt and myself. I prepared that plan in accordance with certain instructions which I will read to the Committee. That plan was completely dispensing with the Birkenhead fork of the low-water basin for the time, but retaining the entrance from the Mersey in the line of the low-water basin, as shown upon the authorised plan, and the sluices at the end of it. I prepared that plan in accordance with the instructions I received, after being employed by the local parties. In the autumn of 1850, I prepared a plan which, in substance, was to retain the authorised plan, except the Birkenhead fork, which was to be closed with a wall across it, and retaining the sluices at the end, to sluice the low-water basin. I think there was an alteration in the sills, but I am not certain. I find the following passage in the Report: "Mr. Rendel proposes the sills of his 70 feet entrance-gates to be laid at the depth of 6 feet below the Old Dock sill, which would give a depth over it of 17 feet 3 inches at average, and 15 feet 3 inches at lowest neap tides. I do not think this sufficient to meet the growing wants of the trade in the face of the fact that there are steam vessels at present in the Mersey drawing from 19 to 21 feet of water, with a breadth over the paddle-boxes of upwards of 77 feet. I have, therefore, altered the breadth of this entrance from 70 to 95 feet, and the depth of sill to

J. Abernethy, 20 May, 1856.

Report of 1850.

Employment by local parties.

Plan of 1850.

J. Abernethy, 20 May, 1856.

13 feet 9 inches below the Old Dock sill, or 3 feet 9 inches below the general average of the float walls." That was the sill of the entrance into the great float, at the head of the main fork. The date of this report is January the 20th, 1851. I lowered the sill below the depth proposed at the time by Mr. Rendel; and for this reason: it was on the supposition that if the water was run down upon the float to meet the sluicing required, there would not be a sufficient depth—a depth of 6 feet over that sill, assuming the water to be run down, as it would have to be, to the 13 feet level. The deviation made from the authorised plan was making the entrances wider, and the sill of the tide-gates deeper; I made no alterations in any other respect, except closing up the Birkenhead fork. I will read the instructions under which I made that plan; it was to this effect: I was to report on the "best means of completing the deep-water entrances to the great float at the earliest possible period within the limits of the Parliamentary powers, with due regard to economy and the present and future requirements of the trade." I was confined, therefore, to the Parliamentary plan. I recommended what was best to be done to carry out the plan of Mr. Rendel as a whole, with the idea of carrying out the plan of 1843, when Wallasey Pool was treated as a highway. I did not at the time, either to the Admiralty or to the local parties, report any of the objections to the authorised plan now detailed; and I may mention that the first time objections to the authorised plan occurred to me was in consequence of the report made by Mr. Rendel, in answer to my report. The objections he pointed out to the modifications of the then plan struck me so forcibly, that I thought it necessary to see whether those objections would not apply to the plan with much greater force as a whole. After Mr. Rendel's enlightenment, I became a converted man. I began to treat the great float as a dock, and to consider the best means of making an entrance into the great float. I made a reply to the report of the inquiry before Admiral Beaufort and Mr. Stephenson. On that inquiry I stated the same objections that I have done to-day to the low-water basin, and also to the variation of the great float as affecting the ships' moorings. I have not stated anything to-day that I did not state to Admiral Beaufort and Mr. Robert Stephenson upon that subject. These objections were stated before the Committee on the Bill of 1852. I have been employed in carrying out for the Corporation of Liverpool the large graving docks extending from the Woodside Ferry up to near Monks Ferry; as belonging to the Corporation, they may be treated as public works. They are leased to private individuals; to Mr. John Laird, in part; the same Mr. John Laird whom the Corporation took into their counsels. The Corporation find the money, and Mr. John Laird leases the graving docks at a certain rent with other parties; there are several lessees. I came into the employment of the Corporation for carrying out those works about two years ago. It was part of the original design that steamers should resort to the low-water

Alterations proposed in 1851.

Great float treated as a dock.

basin. If the steamer was near the ground the action of her paddles would scoop a hole underneath the bottom of the steamer, and throw the stuff so removed behind her. I think the state of things in that basin would be such a state of still water, that the silt would really be deposited as in the half-tide basin. The trade into the float might be worked to a limited extent by the Egerton Lock, but that is a very small lock; a vessel of 500 tons would be about the extreme tonnage it would take; it might take an old-fashioned vessel of 500 tons perhaps. *J. Abernethy*, 20 May, 1856.

Cross-examined by Mr. Calvert. *Cross-examination.*

My objection on the subject of sluicing is that in the low-water basin there are 538,720 cubic yards of water, and that the quantity of water that would descend at each tide on the average, amounts to only 433,583 cubic yards; I measure the quantity of water upon the supposition that the average height to which the water rises in the float is 14 feet 9½ inches; and that therefore there is only 1 foot 9½ inches to be multiplied by the surface of the water. My notion is that the sluicing would be required at almost every tide. I believe it would be better if it could be done, as Mr. Rendel himself suggests, every tide; I think that doing it three or four times every spring would not be sufficient. I do not remember expressing any opinion as to the working of the great float; I expressed an opinion as to the scheme as a whole of converting the Wallasey Pool into a highway, and maintaining the great low-water basin by sluicing. I believe it would have been possible, if the original plan had been carried out, to have used the Wallasey Pool as a highway; but if what was originally contemplated as a highway is turned into a dock, we cannot treat the two subjects in the same way; whether as a highway or as a dock, we cannot get there if that low-water basin is silted up. I always contemplated that a dredger would be required to a certain extent for the maintenance of that great low-water basin. At that time I considered that the sluicing, according to the scheme then proposed, accompanied by dredging, would keep the low-water basin clear, and I believe it still. I did not specify in my report that I thought dredging would be necessary. It is not advisable for vessels to pass into a dock under way. I think if a vessel went in under way she certainly would have to drop her anchor to bring up, and two or three vessels passing into the great low-water basin, one after the other in that manner, a collision would very likely take place, and I may mention, as an instance, that the entrance of the dock at Aberdeen is upwards of 4000 feet from the pier-heads, and I have seen vessels which came in under way there have to drop their anchors before coming up to the gates, and I have seen cases of collision from vessels coming in after them, not being able to clear them. To a vessel 2 feet higher than the wharf, or 6 or 8 feet higher, the variation of level

Sluicing inoperative without dredging.

Vessels entering a basin.

J. Meredith, 29 May, 1852.

might be a very great convenience, for the purpose of carrying on the communication between the wharf and the vessel; but as regards another vessel lading there it might not be. I believe that the London Dock level is about 8 feet 9 inches, and that is found to be a convenient height for working. A light vessel might be lying considerably above the quay; but a laden vessel considerably below the quay. It may be an advantage as regards the high vessel, and a disadvantage as regards the laden vessel. The Clyde is a tidal harbour, but it is a fact that I have myself converted two tidal harbours into docks to remedy the inconvenience of working a tidal harbour. I am not so well acquainted with the details of the Liverpool Docks as to be able to say whether the variation is not with every tide. They have made a tidal harbour at Greenock, because they failed in making a dock; but I believe, if they had the means, they would make it a dock to-morrow. As to the comparative extent of the entrances, I mean that Mr. Hartley affords a greater extent of entrance than Mr. Rendel. I speak of the entrance into the great float. Mr. Hartley provides three locks; Mr. Rendel has only one available lock for a considerable period of the year during neap tides, at other times he has a passage with a single pair of gates, and that I consider a dangerous passage. Mr. Hartley's third lock I should consider a good-sized lock; the middle one is, I presume, for the smaller class of vessels. If we admit that the 100 feet gates are to be used as well as the locks during spring tides, the provision would be in both cases about equal, but I have already pointed out that during neap tides those single gates must be closed, and the only passage into the great float is through the great lock.

Variation of level.

Comparative extent of entrances.

Re-examined by Mr. Merewether.

If Wallasey Pool had been preserved as a simple highway, leading to docks to be built at the margin, I should have dealt with it as a highway; but the fact is, the Liverpool Corporation have purchased the great float as a dock, to be treated as a dock; and so I must treat it. The extracts from my reports had reference to a state of things which has been altered since. In 1851, when I made my plan, I had all Mr. Rendel's various plans before me. My purpose was to treat the great float as a dock. The whole circumstances of the case have been changed. What was originally intended as a mere passage or highway, was then, in fact, to be a dock; and I designed those entrances with a view of working the float as a dock.

Float becomes a dock.

By Mr. Webster (*through the Committee*).—I am aware that the clause fixing the level of 13 feet was introduced into the Act of 1848; my first variation was in December, 1850; of other plans referred to, the one plan was the 20th of February, 1851, and the other plan the 24th of April, 1851; they are both the same year.

George Rennie, examined by Mr. Loch.

G. Rennie, 20 May, 1856.

I am a civil engineer, and have turned my attention particularly to hydraulic engineering, with reference especially to harbours and docks. I have reported upon a great many encroachments upon different parts of the Mersey, and, among others, on the Wallasey and Leasowes. I have known the river Mersey almost ever since 1821; and have examined both the river and the estuary with regard to the various inquiries that have taken place since that period. I have been cognizant of most of the dock schemes that have been suggested for Wallasey Pool since 1840 down to the present time, and of Mr. Rendel's plans, as they have been at different times before Parliament. I was also acquainted with the modifications proposed in those plans by Mr. Abernethy, and supported those modifications. I believed them to be an improvement upon Mr. Rendel's plans, and I am still of that opinion. The foundation of that preference was, that the plans made, according to my views, better use of the land for which they were made. Another reason was, I considered that the tidal basin was too large to maintain by sluicing. Another reason was, that I considered Mr. Abernethy's plan would do more work, that is to say, it would let into the float more vessels, and do the same in letting them out; that the outer basin was easier maintained in depth; that the half-tide basin was easier worked for the railway. Those were the principal grounds. I am aware of Mr. Hartley's modifications of Mr. Abernethy's plan; in my opinion they are a still further improvement upon the original design. In my opinion the changes proposed by Mr. Hartley carry out in a still greater degree those advantages which I believe Mr. Abernethy's plan to have over Mr. Rendel's. I think the main feature of the improvement proposed by Mr. Hartley, is the introduction of locks between the low-water basin and the tidal basin. I think that those locks, being three in number, are capable of admitting more vessels than two. I call the outer one the low-water basin, and the intermediate one the half-tide basin. I think that there is also an improvement in having one more lock between the intermediate basin and the great float. Having three locks in place of two entrances is an improvement. I conceive that Mr. Hartley's plan will accomplish more work than by carrying out the original scheme of the great low-water basin. My feeling as to the great low-water basin of Mr. Rendel's plan is, that with a depth of 12 feet of water at low water no sluicing you can devise will maintain it at that depth. That opinion is founded upon my practical knowledge and experience. I have never anywhere seen it performed even to half the extent. The cases I refer to are the docks in London. I have seen and been present at an experiment made in the London Docks, where a basin, with a rounded and bricked bottom, could not be maintained at a greater depth than 7 feet; it being a smooth bottom, the water let out from the lock had a tendency to drive

Comparison of plans.

Sluicing in low-water basin.

G. Rennie, 20 May, 1856.

the water before it, but when it got to a distance of 300 feet from the lock it was scarcely effective. I am acquainted with the harbour of Dover; sluicing is employed there; so far as the sluicing goes the sluices are differently disposed, but the principle is the same; the sluicing is into still water; the depth varies, but the depth at low water is from 3 to 4 feet, I should think. It produces very little effect indeed. I refer to the outer sluices which go through the old pier-head; those are made of cast iron; on certain parts gravel used to accumulate to a great extent. The object of those sluices was to remove that gravel by setting those sluices in motion. They did have that effect at the time, but to keep it a very good low-water harbour they never have been able to do.

Sluicing at Dover.

At Ramsgate.

Ramsgate harbour is a low-water harbour, into which at neap tides they open the sluices, and allow the water to run from the inside of that harbour. The water runs, I think, a distance from the mouth of the sluices to the eastern pier of about 200 feet, and it clears the bottom from the mouth of the sluices until it gets into the low-water mark, at the mouth of Ramsgate harbour; and there I think there is a depth of 7 feet water—further it cannot go. So long as the escaping water runs over a dry surface, it does to a certain extent scour away the ground; but it ceases to do so when it gets to water that is still; it ceases to a certain extent to do so at the depth of 4 or 5 feet; they employ rakes also during the time of drawing the sluices; Ramsgate harbour affords no encouragement for believing that Mr. Rendel's scheme, as to sluicing, would be successful. I am well acquainted with most foreign harbours; I am acquainted with Dieppe. Perhaps I may read this in explanation to the Committee: "This port is formed by three small rivers or streams, the Arques, the Bethune, and the Eaulne, which here unite and empty themselves into the sea. At the south end of the town there is a dam with sluices across, so as to pen up 115 acres, and be capable of discharging 523,000 cubic metres in one hour. This water has to run off in one hour, through a distance of 1500 feet, between two jetties of masonry and timber, from 300 to 500 feet apart. The eastern jetty is now being extended 470 feet further to seaward. Nevertheless, in westerly gales the mouth of the harbour is frequently blocked up. At low tides the channel is dry for 200 feet." The water from the sluices goes into water of a very shallow depth; a shallow depth of from 3 to 4 feet, which does not deepen a long way out; it does not perform the duty of scouring out the harbour effectually; they are obliged to have rakes and dredges. The scouring power at Havre is limited to 114,000 cubic metres. This port is often blocked up, which renders the keeping it open by sluicing, dredging, and rakes, very expensive. A great deal of money has been spent at Boulogne. The river Lianne has been converted into a reservoir of 150 acres, to contain 220,000 cubic metres, which are used for scouring the harbour; the entrance to the outer harbour is formed by two wooden jetties carried out to sea, and the distance between the piers is 230 feet; those piers are above 3000

Foreign harbours.

Dieppe.

Boulogne.

feet long. The harbour at Boulogne is placed upon the opening of a natural river; there is no great depth of water at the spot where the water from the sluices first enters upon the place which it has to cleanse; not exceeding 4 feet. Calais is much in the same predicament as Boulogne. Calais harbour is bounded on each side by wooden jetties, one on the east side, 3200 feet long; the other on the west side, 3140 feet long; both piers are filled to the level of high-water ordinary tides with solid stones, except the last 500 feet, which are open. They employ sluicing at Calais; the sluicing reservoir contains 300,000 cubic metres of water, which is discharged in one hour; at low-water spring tides there are from 2 to 3 feet at the lower end of the channel. It succeeds to the extent of making 2 or 3 feet water at the end; it depends upon the state of the tide. Dunkirk was formerly a deep harbour. The present harbour is formed by a channel 4900 feet long and 165 feet wide; the channel is nearly dry at low water: it is lined by two rubble piers, except for 1900 feet near the sluice called the Cuvette. On the left side of the entrance channel, and 1500 feet from the pier-head, there is a circular reservoir of 75 acres, having, I think, four sluices—but I do not quite remember whether four or six—at the lower end, for the purpose of discharging the tidal water to scour out the channel: it makes an angle with the main channel of about 126 degrees, and on the right of the channel making an angle of 130 degrees with the main entrance channel called La Cuvette. The two floating basins and other canals assist occasionally in scouring, so that the total quantity available is about 900,000 cubic metres, which can be discharged in one hour. They are now extending the two jetties of the channel 620 feet further to sea, so as to make the entrance nearly a mile in length. Notwithstanding all this sluicing power and extent of the works, such is the flatness of the shore that vessels drawing more than 11 feet of water can only enter the inner harbour at high water of ordinary tides, and vessels of 14 feet water at high water of spring tides. That is the result of my inquiries. Ostend I know very well; it has a canal running into a harbour surrounded by wooden quays. They sluice into it, and preserve from 3 to 4 feet deep at low water. I have not the particulars here. At Calais they keep from 2 to 3 feet by the effect of the sluices, and at Dunkirk from 3 to 4; at the time I was there with the engineer there was a remarkably good tide. The sluicing had the effect of making in both cases the harbours much deeper than they otherwise would have been, but that is owing to the shallow water in which they have to run. The sluicing water there has not to contend against a great body of still water, as would be the case at Birkenhead. The results accomplished in the harbours I have mentioned afford no reason for supposing that similar results could be accomplished under the circumstances at Birkenhead.

G. Rennie, 20 May, 1856.

Calais.

Dunkirk.

Ostend.

G. Rennie, 20 May, 1846.

Cross-examination.

Cross-examined by Mr. Webster.

All those foreign harbours are upon the sea coast; at Dunkirk I think there is no shingle; I do not remember; I think it is all sand. It is all sand; it goes out a long way. Those harbours, at the end of three or four years, if there was none of this sluicing which I have spoken of, would have been very bad indeed; they would be shut up probably. Dunkirk harbour was formerly a very fine harbour; it was a fine harbour by natural means. Dunkirk had a large back country, and that back country was overflowed by water, and the water used to rush by and cause that harbour to be excavated so deep that vessels of 1000 tons have been in Dunkirk harbour, and now vessels of 500 tons can hardly get in. The abstraction of that back-water was a very serious thing; it led to the deterioration of the harbour. There is shingle at Dieppe. Dunkirk and those other harbours would be quite closed up but for the sluicing operations I have spoken of. The quantity of sluicing water at Ramsgate is represented by a basin of 12 acres of 10 feet deep, and that is all run off in twenty-five minutes, so you must make your own calculation from that. At ordinary spring tides the inner basin contains 6,602,000 cubic feet of water; at ordinary tides it contains 1,186,480. I should consider Ramsgate as a very successful experiment for that quantity of water, and under the circumstances of Ramsgate harbour; if they did not sluice, Ramsgate harbour would be very bad. I cannot tell how long it would be before it was closed up, but they are obliged to take out 100,000 cubic feet of mud in a year. It would be closed up in twelve months. I was the engineer of the London Docks some time ago; Mr. Rendel is now; the experiment tried there was opening the sluices in the gates and letting the water out at neap tide; it went into the Thames; I think the distance was 300 feet beyond the gates. I concluded from that, that we could not obtain a depth of more than 4 or 5 feet. I cannot tell you how Mr. Hartley is to maintain the depth that he proposes by sluicing from his gates; I do not think he could maintain that depth; but he could do it easier than with the other basin. I do not know of any instance in which there is a low-water basin communicating with a river like the Mersey, through which there will be this current which Mr. Rendel represents, going into a river like the Mersey. I have been consulted by the Corporation of Liverpool for a good many years. I was examined in opposition to the original Birkenhead Bill of 1844, both in the Commons and in the Lords, I think; I was also examined before Admiral Beaufort and Mr. Stephenson; upon all those occasions I told pretty much the same story as to my objections. In 1844, when examined in the House of Commons, in answer to the question, "Will you explain to the Committee whether you believe it would be expedient to deprive the river Mersey of the water of Wallasey Pool?" I replied, "The doctrine I have always, in conjunction with other engineers who have reported upon this subject,

Difficulty of maintaining either basin.

held, is simply this: that it is very desirable and necessary to keep all the creeks and havens of the whole estuary into which the sea-water runs, sacred; that is, that they shall not be encroached upon with reference to the creek in question; that formed part of our report. I made a report on the subject in 1822, and subsequently in 1834 and 1836; and there we enjoined, and I individually enjoined, the necessity of keeping that open for the use of the river, on the ground that it would be depriving the harbour of so much space over which the tidal water flows, and, *pro tanto*, do injury to the navigation of the river." I adhere to that opinion. In answer to the questions, "That is in particular with regard to the sea channels?" "Yes, with regard to the sea channels." "Do you think that the exclusion of the water at Wallasey Pool would be inexpedient?" I replied, "I would not answer that by the word inexpedient; it would be at war with the doctrines we have maintained." Those were the opinions I expressed then on the inexpediency of depriving the river Mersey and the Victoria Bar of the water from Wallasey Pool. I came for the Corporation then; those were the grounds upon which I came for the Corporation in 1844. I do not recollect at that time any other objection to Mr. Rendel's plan, than that it deprived the river of the water of Wallasey Pool. I was also examined with reference to a report that I made on Wallasey Pool and on Tranmore Pool, in the preceding year. I believe I stated as my objection to Mr. Rendel's plan, that his proposal to close the pool would deprive the estuary of the Mersey of so much water as would endanger the sea channels. I believe that was the view which the Corporation and the Dock Trustees then took; that, so far as I am aware, was the one ground of their opposition then. So far as I was employed, it was upon that view of the question. I heard Mr. Hartley state the way in which he proposes to bring the water by culverts from the great float to his entrance basin. I know nothing about the way in which he proposes to do it, except from what I heard of his evidence. There is great retardation to the flow in bringing water through culverts to the distance of some 2000 feet from that great float; but you must make them large enough. The bringing it that distance through a culvert will make a very considerable reduction in the velocity before it comes to the mouth, if the culvert is too small. I call a large culvert one of 6 feet in diameter. It is a question of degree. I cannot say off-hand what size would be sufficient to prevent that very considerable retardation and diminution in velocity. I remember being asked in 1844, "What is your opinion as to the practicability of constructing docks in Wallasey Pool without the abstraction of the tidal water?" and answering, "I do not come here to oppose the Dock Company. It is contrary to my custom to oppose any Bill, but if it should appear to the Committee to be expedient to make docks, then I think they could be made so as to preserve our principle at Wallasey Pool of back-water, and still be good and effective docks." It was one part of the contest and argu-

S. Brooks, 20 May, 1846.

Water of estuary to be preserved.

Retardation of water in culverts.

G. Rennie, 20 May, 1856.

ment in 1844 as to which I was then giving evidence on the part of the Corporation and the Dock Trustees, that by reason of the time at which Mr. Rendel returned the water from Wallasey Pool, it would be as efficient at the bar as the water running off from Wallasey Pool in its natural state. Nothing has occurred since 1844 to lead me to change the opinions expressed upon the consequences that might result from abstracting this quantity of back-water. I believe I repeated before Admiral Beaufort and Mr. Stephenson the same objections as I had stated in 1844, though I do not recollect what I said. It is possible I said, "I have always considered that the great object of the open basin (referring to the model) was a harbour of refuge—simply a boon from the Government to the public." I do not deny it. Assuming that I used those expressions, I believe it was with reference to the Woodside Basin having been given up to the public, and also with reference to the accommodation that was to be furnished by the low-water basin.

Abstraction of back water.

I did not hear Mr. Hartley say that each of his culverts was to have an area of 117 square feet; assuming it to be 117 square feet in section, and 2000 feet long, the retardation in such a culvert is a puzzling question. In 1844 I was asked as to my experiments with respect to the flow of water in channels and pipes; those experiments have been published in some of the Transactions of the Royal Society, and also another set by the British Association. Experiments on pipes show a very great retardation, depending on the elongation of the pipe; though it does not observe an exact law, there is a considerable retardation, that is, if you increase the length of the pipe. In the case spoken of, a pipe one foot long ran off in 55 seconds a cubic foot of water, under a pressure of 4 feet; but if the pipe be elongated to 11 feet, or thereabouts, it takes double the time for the same quantity to run out. There are means of ascertaining what will be the retardation and loss of velocity in a culvert of this kind of 117 square feet and 2000 feet long, as Mr. Hartley proposes; but I should make it big enough. I should regard it as an experiment of Mr. Hartley's; a gigantic experiment.

Retardation in culvert.

Re-examined by Mr. Loch.

In the evidence as to harbours I did not mean to say that the sluicing was of no use, but that it only produced certain limited effects; effects so limited that I could find in them no reason for believing that the effects taken credit for by Mr. Rendel in his sluicing power here, could be accomplished. I have seen in no case a greater depth of water than 4 or 5 feet acquired by means of those sluices. If Mr. Hartley will have difficulty in keeping clear his open basin of 4 acres, the difficulty will be much increased if the area were 27 acres, as Mr. Rendel proposes. If Mr. Rendel should propose to sluice at any other time of tide than low water, there would be a greater depth of still water to contend

Effect of sluicing.

against, therefore that difficulty would be increased; there would still be 2000 feet of distance, over which it would have to operate upon a body of still water before it reached the current of the Mersey. There would be perceptible motion in the water lying in the low-water basin, even though the current were running past its mouth in the river, if you had enough water; not three miles an hour, as they state. In 1844, the Corporation opposed the then scheme of making docks in Wallasey Pool; the ground they took was, that they objected to the exclusion from Wallasey Pool of the tidal water, and my evidence was to the effect that that water, in flowing back again from Wallasey Pool, as the tide receded, helped to scour the bar of the river; I remain of that opinion still. There was no objection then raised by the Corporation to the plans proposed by Mr. Rendel; the Corporation, then, appeared simply in their character as conservators of the river, according to my knowledge; having nothing to do with plans in those days.

G. Rennie, 20 May, 1856.

Opposition of Corporation in 1844.

By Mr. Webster.—I say, the Corporation appeared in their character as conservators of the river; I am not aware that there was a Conservancy Board in 1844; my impression is, that there was no Conservancy Board in 1844. Assuming there was a Conservancy Board in 1844, I suppose the Corporation, notwithstanding that, appeared as claiming to be conservators; I cannot say to what extent there would be a motion at the mouth of Mr. Rendel's low-water basin.

Thursday, 22nd May, 1856.

Sir John Macneill, examined by Mr. Bramah.

Sir J. Macneill, 22 May, 1856.

I am a civil engineer, and have been occupied for thirty years upon various works; before railways came so very much into practice, I was connected with harbours and canal work—river works. I was a considerable length of time in Mr. Telford's office, and had an opportunity of seeing what he did, and knowing a good deal of his works. I am acquainted with Birkenhead. I have heard the evidence given by Mr. Hartley and Mr. Abernethy, and generally coincide with the opinions expressed by them with reference to the proposed plan; there are some minor matters in Mr. Hartley's plan that I do not quite concur in, which do not affect my general opinion of the plan; probably as to the expense as much as anything.

Cross-examined by Mr. Webster.

Cross-examination.

The work most like this under my direction was the Grangemouth works in Scotland, at the eastern extremity of the Forth and Clyde Canal. There was a deep-water basin and a lock of 255 feet in length, about 55 feet in width, which has some resemblance to this; a portion

Sir J. Macneill, 22 May, 1856.

of it was a lock, which I believe was as large as any of the day at those times; there was no half-tide basin there. I attended on the inquiry by Admiral Beaufort and Mr. Stephenson, but I was not asked any questions, to my knowledge. I conversed with Mr. Stephenson and Admiral Beaufort, and gave some opinions; but I do not think I was asked a single question in evidence. I do not remember having expressed an opinion in favour of a half-tide basin as being a most important thing. My impression is, that the whole conversation that took place between myself, Mr. Stephenson, and Admiral Beaufort, was relative to the silting-up of the large outer basin of Mr. Rendel. I should wish to express the opinion that my knowledge of the subject there, and what I was particularly employed upon there, was as to the estimates. That was what I was employed for when I went down to see the place first; and I do not think there was any question asked me at all upon the subject of the relative comparison of different plans. I am not sure whether upon that occasion I expressed an opinion that it would be decidedly advantageous to have a long and a narrow basin, but I should say so now. I do think that there is a great deal too much ground cut up there for water in the plan of Mr. Rendel, where ground is so valuable. I think the shorter the entrance is, with proper convenience, the better I think it could be cleared out,—with more advantage. My idea is, that the entrance should have pointed more down the river; and I think I said so to Admiral Beaufort. If it had pointed more down the river and been longer, I think that the entrance would have produced a better effect, because the westerly wind would not be against it, and there would be less deposit. I think there should be quite sufficient length to cover the largest vessel that is likely to enter it; for the generality of the Ocean steamers, which I believe are under 400 feet—I believe 395 feet is about the largest—I should say it was large enough. I am quite of opinion—and what I said before Admiral Beaufort and Mr. Stephenson I say now—that if the entrance be long enough to cover the largest steamers, you cannot wish it longer. I do not think that there was any note taken of my evidence at all. I stated particularly at the time that I was only examined upon the estimate; when I was told by Mr. Stephenson that he was ready to hear any observations that I was prepared to make upon either of the plans, I said I was not ready, or inclined, or wished to make any observations at all; that I was simply employed to support Mr. Abernethy's estimate; I was not asked a single question either by Admiral Beaufort or Mr. Stephenson about the estimates. I was spoken to by them in conversation as to the probable silting-up, and not anything further, I believe; I remember saying I did not consider the estimates sufficient. For the sake of my own character, I should wish to explain to the Committee that I never remember to have had any other opinion than the one I wish to express now—that if the entrance be sufficiently long to cover a vessel going in, it would be long enough. I am quite sure that I had no other opinion then, nor have I now.

Inquiry before Admiral Beaufort.

Entrance if as long as vessel sufficient.

Sir William Cubitt, examined by Mr. Loch.

Sir W. Cubitt, 22 May, 1856.

I have been present in the room during all this inquiry, and I have attended to the evidence given before the Committee. I am, I think, well acquainted with the Mersey, and with the circumstances connected with the tides and the river itself; I have executed works for the Corporation of Liverpool; the great landing-stage is one of the works. That work has answered the object for which it was established, I believe fully, most amply. Vessels can come up to it at all times of the tide; I am making another at this time, twice as large as that, at Liverpool. Encouraged by the success of the first, I am now making a second twice as long as the former one; the first one having answered its purpose, after a strenuous opposition by the Dock Committee, the Corporation have themselves given an order for a second one twice the size. If a landing-stage of a similar description to that I am now constructing were to be established on the opposite side of the river, I think it would render great facilities to the trade of the port and to the railway system generally connected with the trade of the port coming to the Birkenhead side; the largest vessels would be able to approach it at all times of the tide, so that the railway companies in arranging their trains might arrange them as to time without reference to the tides. The landing-stage is a quay always of the same height from the water at all times. Therefore, in addition to the convenience of the railway traffic being independent of the tides, vessels lying alongside it would never be subject to the inconvenience of being sometimes above and sometimes below the landing-stage. I heard the suggestion that was thrown out of placing such a stage as that opposite to the Woodside Basin. I think if the railways were brought down, not on to the south reserve, but on to the other side of the Morpeth Dock entrance, a landing-stage might be very useful moored opposite to the present river wall or the Woodside Basin. A terminus of that description might be more useful than the railways having to cross over the docks, but that must be the best judged of by the parties who have it. I should, as an engineer, prefer a communication accessible to the parties at all times to a communication that might be interrupted by vessels passing backwards and forwards to the docks; and I was in a degree authorised to speak to Mr. Brunel about it, and to make a tender to him that a landing-stage might be arranged for by them, if they chose to accept it. That took place some little time ago.

Landing-stage at Liverpool.

Recommended at Birkenhead.

Cross-examined by Mr. Calvert.

Cross-examination.

I was first consulted on the arrangement of the plan now before the Committee, Mr. Hartley's plan, about two months ago. When the plans were made, Mr. Hartley sent me down a copy of his proposed plan, but we had no conversation about that plan for a very long time. I think it

Sir W. Cubitt, 22 May, 1856.

must be since I first received the copy, more than two months ago; I think it was immediately after the plans were deposited. I have no nearer recollection than I say; I know the plans have been lying in my office a great time; but I have no idea of the date within a month. I think I did receive those plans before the 1st of March, but I cannot take upon myself to say that I did receive them before the 1st of March; but I think I did. I have no memorandum of when I received them. I never had any conversation with any party on the part of the Corporation of Liverpool. I never had any conversation with any person but Mr. Hartley; the conversation we have had has been very slight; it must have been more than a month ago; I will not say it was before the 22nd of April. I never sent any written opinion regarding those plans to the Corporation of Liverpool. I was retained by the Corporation of Liverpool, it must be three months ago; I should think more than that—perhaps I can let you know that exactly, but not now. Up to that time I had never given any opinion upon the plan. I have known Birkenhead thirteen or fourteen years; my acquaintance with Birkenhead principally began with Mr. Rendel's planning his works there; I think it was in 1843. I then had the means of knowing Mr. Rendel's plan very accurately; he and I had many consultations about it. I have never said that I prefer Mr. Hartley's plan to Mr. Rendel's. For the purpose they are intended for now, and for the hands they are in, I do think the parties who now are the proprietors of the Birkenhead Docks are the best parties to judge of what plans will suit them best. I never was consulted about any comparison of Mr. Rendel's plans with Mr. Hartley's, but I was retained to support Mr. Hartley's case in Parliament, so far as I could; that was all. I support that case—the Birkenhead Docks being regarded as being in the possession of Liverpool—for docks to be framed in connexion with the Liverpool system; I give the preference to Mr. Hartley's plan, because they are docks belonging to the same parties as have all the docks on the Liverpool side, and the whole trade is to be made into one system; therefore I think they are the parties best qualified to know on what system they would prefer to work the two ports, they being made into one port. When the Birkenhead Docks were in the hands of the Birkenhead Trustees, I approved of Mr. Rendel's plans. I have never said I disapproved of them yet. Supposing they were now in the hands of the Birkenhead Trustees, I should be quite willing to assist Mr. Rendel in carrying them out; but they are now in the possession of the Corporation of Liverpool, and they have a different view of the mode of carrying on business, I suppose, from the Birkenhead Trustees. I have nothing to unsay in any evidence I have given with regard to Mr. Rendel's plans, taking the reservation with which that evidence was given, from the beginning to the end, from the year 1844 to the year 1848. I have given much evidence upon them, and an opinion upon them, always subject to the reservation that the mode

The Corporation the best judges of the required accommodation.

of sluicing had not been tried and proved; but I had a very good opinion of it. At the same time, all plans proposed by Mr. Hartley have been proved and tried at various places; they answer the purpose exceedingly well, and would answer the purpose there. The plan of Mr. Rendel for removing the obstruction by sluices, was a plan that I had no proof of. I do not mean to say that I distrust any part of the plan; his plan of the sluices was exceedingly good, and I think new also; but the effect of the sluices had not been proved; a great part of Mr. Rendel's plan was that of a lower current to have extended over the whole of his low-water basin, acting as a scour upon the bottom of it; it is a very simple plan; and if it could be brought into action, I should very much like to see it tried to prove whether it would answer the purpose or no; but on Mr. Hartley's plan, there is no doubt that the thing will be done, and well done. I do not distrust the scouring scheme of Mr. Rendel. I do not distrust it more than I ever did, inasmuch as I distrust everything a little that I have had no proof of. I think Mr. Rendel distrusted it a little himself in some of his evidence which I have heard. In the House of Commons, in 1844, I gave a great deal of evidence, and Mr. Rendel gave a great deal more. (*Several passages from the evidence of the witnesses were read.*) I entertain the same opinion still, but those opinions I want to see proved by absolute fact. Of the two plans all I have said here is, that Mr. Hartley's is a tried and approved plan, and such as the Liverpool Corporation wish to have; and Mr. Rendel's is an untried plan, and has to go through the ordeal of proof some day or another. I heard some evidence given here yesterday as totally against the scheme of Mr. Rendel as could possibly be: it was that Mr. Hartley's large culvert would not sluice out and clear a paved bottom of four acres of water, and if it would not do that, Mr. Rendel's, coming 2000 feet off upon an unpaved bottom, could not have that effect. The length of basin is a benefit to an outer harbour; but Mr. Hartley's is not an outer harbour; the great doubt was, and which I think exists in Mr. Rendel's mind, according to some of his evidence which I could produce, that it did not come up to the standard height for sluicing, and that dredging would have to be resorted to more than he expected.

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Same opinion of Mr. Rendel's plan as in 1844.

One plan tried, the other untried.

Lieutenant Hookey, examined by Mr. Loch.

Lieut. Hookey, 22 May, 1856.

I am an officer in the navy, and have been harbour master at Birkenhead ever since the docks have been formed. I have been connected with and retained in the pay of the Trustees of Birkenhead ever since 1844. I gave evidence in favour of the original scheme; and, in the absence of a better plan, I should be ready to support it now. In 1844, I had not been at all practically acquainted with the working of the docks. I had served always at sea prior to that time. I had never worked or had charge of a dock. The Birkenhead Docks were opened on the 5th of April, 1847; that is, the Morpeth and Egerton Docks;

Lieut. Hookey, 22 May, 1856.

the whole float has been opened up since that. The charge of working those portions of the docks has been under my hands entirely from the commencement. Since 1844 my attention has been very much attracted to the nature of the waters of the Mersey, with reference to the silt or sand carried in solution by those waters. I have had occasion to observe it, with reference to the entrance to Morpeth Dock, through the Woodside Basin; it deposits there in considerable quantity. I do not remember that, in 1844, I gave any opinion upon the subject of keeping the basin open; but from what I have seen of the mud and silt accumulating, I am of opinion that the proposed mode of sluicing the great low-water basin would be a failure. I base that opinion upon this: I think that by thrusting out a large quantity of water with a great head above it in a horizontal manner, as proposed by Mr. Rendel, which would be met by the very large body of 12 feet of water in perpendicular height, to an extent of more than 20,000 feet in the basin, and also meeting a large quantity of water in the river Mersey, the effect would be, that directly it was so checked by the still water, it would immediately have a tendency of rising to the surface, where no doubt there would be less resistance. The motion of the water would incommode small vessels in the basin. From the experience which I have had of working docks, and we have something like that at the Morpeth Dock, I do think it is a most dangerous system to trust so large a body of water behind one gate. I have heard it here instanced with regard to the West India Docks lately; it was held there by a single gate, and a single gate only. Now, it is very true that Mr. Hartley has a single gate for the entrance, but then it is protected by gates between the river and it; and there is another thing to be said in favour of Mr. Hartley's single gates, they will never have the same amount of perpendicular pressure upon them that Mr. Rendel's have, because Mr. Rendel's must partake of the difference between the level of the water in the float, and the level of the extreme low water at spring tides, which is something very enormous. Now Mr. Hartley's will never have that amount of pressure, because the intermediate dock will never be run down to the level of low water. There is another feature in Mr. Rendel's plan which my experience tells me would be an inconvenience as to the mode of working the single gates, they can only in the first instance be opened when the tide of the Mersey is level with the water of the float, at all other times, of necessity they must be kept shut; and as Mr. Rendel proposes to run the great float of 150 acres down to the level of 13 feet, supposing we take a 21 feet tide, there will be 8 feet of difference between the level at high water of the water in the Mersey, and the level of the float at the 13 feet level. The Mersey having to rise 8 feet perpendicular above that level, there will be an enormous current running through the single entrance, because a spring tide at Liverpool at the time when there are 8 feet to rise, will rise about an inch a minute, or 5 feet an hour, therefore there will be a most inconvenient current running

Danger of single gates.

through that entrance when it is to be used for the purpose of getting ships through it from the float into the Mersey, more particularly that way than the other way. From the experience I have gained of the working of docks now, I am perfectly persuaded that the more equal you can keep the level of the water, the better for all commercial purposes; we only vary our level over the whole fortnight to the extent of about 20 inches. The rise and fall of the average spring tide is about 27 feet. In the great low-water basin, that rise and fall would occur every spring tide; the neap tides would be rather less. As the water alters its level, the moorings must be altered to correspond with it; that is not a convenient thing; I think the inconvenience of the fluctuation of the level is not alone confined to changing the moorings of the ships, but it deranges all the stages that are placed from the shore to the ship, for the purpose of carrying the cargo on board, or the cargo on shore. If you drop the ships, as it is proposed to do by Mr. Rendel's plan, 7 or 8 feet in a very short time, you of necessity derange all the working of those ships, as far as the discharging or loading of them goes, until you have prepared your stage again to meet the case, in addition to the alteration of the moorings. The prevailing wind in the Mersey is from the west to the north; the most severe gales take place from the north-west. The north-west wind blows quite down the low-water basin. There is high land at Bidston, but with the exception of that land, which is 3 miles distant from the mouth of the basin, there is no protection from the current of the wind. Wallasey Pool forms a sort of gulley or funnel—a conductor for the wind, I may say. It was thought, and I must admit that I thought, among others, in 1844, before I had gained any experience in the working of the docks, that the great low-water basin might have been useful to protect ships from those severe gales of wind, but from what I have seen and experienced since, and that is a very considerable time now, in working the docks, I think it could not be used for that purpose; I think it would be very difficult for ships to get in, and I think they would be most terribly in the way of working vessels in and out of that dock if they were in. If ships are allowed to be moored there, or to anchor in the basin, that would greatly interfere with the passage of vessels in and out of the float through the gates, and for large ships there would not be water at low-water spring tides for them. The depth of water at low-water spring tides is to be in the basin 12 feet; that would not float a large ship. The ships now engaged in the foreign trade in the port of Liverpool draw on an average from 18 to 19 feet; there are extremes above that. Ships have increased very much of late years, but not so much in the depth of water as they have in length and capacity. I know all the plans that have been proposed for the entrance into the Mersey great float, and I am clearly of opinion that that of Mr. Hartley is the best that has been proposed yet; I aided Mr. Abernethy in the plan that was proposed then; and I am ready to admit that Mr. Hartley's plan is

Lieut. Hookey, 22 May, 1856.

Inconvenience of varying level.

Wind down Wallasey Pool.

Obstruction of vessels in low-water basin.

Lieut. Hookey, 22 May, 1856. Railway at Birkenhead.

an improvement upon it. One of the most important branches of the trade now carried on at Birkenhead is the export of coal brought down from the mines of North Wales by railway; I should think it would be from 60 to 70 per cent. of the whole trade; I am speaking of the paying traffic of the docks. The coals to be loaded into the vessels are brought down on to the quay of the Morpeth and Egerton Docks. The trains of these coal waggons are frequently of great length, and remain for a long period of time on those quays before the coal can be discharged into the ship; I find it extremely inconvenient at times; they come down in a very great number, I suppose to the number of 20 or 25 waggons at a time; I have known them to remain on those quays when there are no vessels for them for a fortnight together. The whole of the coal that is shipped into vessels in the dock at Birkenhead at present, of necessity must come down the Cheshire Junction Railway; the bulk of them comes along this side of the Morpeth Dock, for the whole length of that dock, I may say, is almost constantly filled with ships receiving coal from waggons. There is another portion, not so large a quantity, but still there is a very considerable proportion, goes to ships in the Egerton Dock; then there is another portion of them that comes down the same railway, but it goes along in this direction to the station there, which is the Cheshire Junction goods station; but there they are only shipped into flats, for the purpose of being taken into the river, or to be taken into Liverpool for the use of the ships there. All the traffic that is carried on by the Great Western is brought on to the same line of rails till they get to this point, and then they cross the bridge between the Morpeth and Egerton Docks; they have their station upon that portion of the south reserve. That bridge is of very considerable span, and is thrown across by wheels at one end of it; it is not the usual divided bridge, but it is a bridge that spans it in the whole. There is a very considerable traffic carried on by the Great Western on to the south reserve: it consists of manufactured goods that are brought down from Birmingham. There is a great deal of railway iron, I believe, shipped there, and a great many anchors and chains. That bridge is under my control as harbour master; the bridge, the gates, and the caissons, of necessity must be under the charge of those who have the working of the docks. We have found the bridge interfere with us, especially when we want to pass vessels through backwards and forwards. At present we are not so much inconvenienced in that respect as we should be if there were passenger trains, because they are all goods trains now that are taken from the south reserve side of the Morpeth Docks. They are all goods trains, and they are not in any particular hurry as to time, and consequently their business is suited by waiting to accommodate us, and we accommodate them, so that when we require the bridge not to be thrown across they do not object to it, because they are not bound to any specific time about those goods trains; but if passenger trains were going, especially as we can fix no

Present railway stations.

time for passing that railway bridge—it varies according to the tide: to-day it may be at nine o'clock, to-morrow it may be at ten, so that of necessity in the revolution of the fortnight we must take every hour in the twenty-four—passenger trains must be impeded at those times. I have made some observations with reference to the use of that Woodside Basin by the coasters. I took a note on the 22nd of April, and I continued to the 1st of May; it averages for the south reserve and the Woodside Basin ten vessels daily; the south reserve is not much used; the Woodside Basin is used more particularly for supplying the town with coal. The south reserve is covered with water at high water; there are some few vessels that beach upon it near to the river; they remain dry there when at low water. During those days that my attention was called to it particularly, there were, on the average, about twenty in a week; that is, ten in one and about eleven in the other. The general use of the Woodside Basin is to discharge the coal and the timber from vessels that are brought there, which is taken up the slip that is prepared for the purpose, for the consumption of the town of Birkenhead; that is the principal use of the Woodside Basin. There were, on the average, five vessels discharging in that way, and from four to five that were making use of the part nearest the river as a beaching ground. That is besides the vessels in the south reserve. The flats, generally speaking, prefer going into the docks. They pay for it half-a-crown, for the asylum that is afforded to them; we have large numbers that go into the Morpeth Dock as a refuge—vessels waiting with their cargoes to be sold. A very great many flats come into the Morpeth Dock, and there they remain, until the cargo that is in them is sold, and from thence they go to the ship for which the cargo is bought, and discharge it into her. The ship may be sometimes in the Morpeth Dock, and sometimes in the Liverpool Docks, as the case may be. The flats' cargoes consist of salt or coal.

Lieut. Hookey, 22 May, 1856.

Coasters in Woodside Basin.

Local traffic at Woodside.

Cross-examined by Mr. Calvert.

Cross-examination.

The Bill of 1844 was opposed at that time by the Corporation of Liverpool and the Dock Trustees. The funnel theory of the wind coming down the Wallasey Pool was their great stalking-horse at that time, and by experience I find it to be true. I am still of opinion "that this is a basin that might be entered in almost any wind." I should conceive that you might enter it in all winds; and you could certainly enter it in all winds better than you could enter any other basin that I am acquainted with, from its great width. I believe the worst winds for the port of Liverpool are north-westerly winds. Those are the most dangerous and the most prevalent; that is, they prevail, I think, from about the south-west to north-west. I said then: "By sailing up the entrance of this basin you would have the wind about the beam, and under those circumstances you would put your vessel under commanding sail, and as you approached this part, you would be

Access to low-water basin in any wind.

Lieut. Hookey, 2 May, 1856.

shooting head to wind. I think that if any difficulty were to arise here, it would be that she would have too much way rather than too little, and that you might obviate by having mooring buoys and a boat in attendance, and running a line out; or, in the event of your being driven to it, you could let your anchor go." Those circumstances are not altered at all. I said before that I had no experience whatever in the working of docks in 1844, when I gave that evidence; from great experience I have obtained since, and from the attention I have paid to it, I do believe that could not be carried out. I said the low-water basin might be entered with almost any wind. I do not now dispute that it is the fact; but I repeat again, from the experience I have now had in the working of docks, and from the great amount of traffic that Mr. Rendel proposes to carry on in that basin, it would be inconvenient to lay buoys down in it. I do not think that any ship could with safety shoot herself into that basin when the traffic was going on. I should always prefer taking a ship on the weather shore, if you could get it. I have said, within the last two or three years, that the Morpeth Dock entrance was the best entrance in the Mersey; I did say so at the time; I did say that I believed it was so; and as far as its depth is concerned it is a very good entrance now. There have been entrances made at Liverpool since I made use of that expression. I say now that the Morpeth Dock entrance is a very good entrance to the dock. There are entrances at Liverpool which are better than the Morpeth Dock entrance, because they are deeper. Except that some of the recent dock entrances are deeper, there is no one, having regard to the prevailing wind, so good as the Morpeth Dock entrance; I do not know that any of them equal it, taking into consideration that there must be a strong wind to contend with. My experience as harbour master began at Birkenhead in 1847, nine years ago. I said in the House of Commons, in 1848: "When the great low-water basin at Birkenhead is made, there will be no basin on the Liverpool side affording the same convenience for entering or accommodation, at all comparable; it will do away with the difficulty, inconvenience, and expense now experienced at Liverpool. In a neap tide there will be 19 feet water in the basin, at low-water; vessels are entirely excluded during neap tides even at high water at Liverpool. I say now, there is no basin at Liverpool equal to what the low-water basin would have been if it had been made. During the last session I gave evidence in opposition to the Liverpool Docks Bill; I consider that the natural capabilities of the site of the Birkenhead Docks fit them particularly for the traffic of the Mersey; I know that they have the means of making the deep-water entrances; there can be no doubt about it, and there is another very great advantage at Birkenhead—it is not alone that it is capable of affording very deep water entrances to the docks, but at the same time there is very little silt; we know that from experience. There is a small dock there, the only entrance that we have at present, called the Morpeth Dock, that basin

Weather shore for docking.

Morpeth entrance the best in the Mersey.

Deep water and little silt at Birkenhead.

is complete; a mistake was made the other day on its being represented as 40 feet in width, we have gates of 50 feet; and we admit ships of the largest class into those docks; we have had them upwards of 2000 tons. The docks have been opened now going on eight years, and we have used a dredging machine only last autumn for about three weeks; with the exception of that we have never had occasion to remove one spoonful of silt out of it at all, and we never cleanse round the gates. I think nothing can prove more strongly than that the silt upon that side is of very minor importance indeed, as compared with Liverpool. I can only account for it in this way—from the formation of the land, when the sea is turbulent and the wind blowing, it comes over the Burbo Sand, and takes in a large quantity of sand, which, being held in suspension, goes to the lee side of the river, and they are constantly at Liverpool dredging the docks to keep them open; we have taken very little silt indeed, and that only in the autumn of last year, out of one dock, the other docks we have not touched at all." I have no reason to deny one single word of that; I admit they have a large amount of silt at Liverpool beyond what we have at Birkenhead. I gave that evidence last year, and I adhere to it now closely. We have a great number of coal and salt flats that actually prefer going into the low-water basin, or rather, into the Morpeth Dock, to lying in the river or in the Woodside Basin, and prefer to pay for it. If the authorised plan was carried out, I do not think so convenient an entrance as the Morpeth Dock is would ever be given up; it would not be used to the same extent. We have that convenience for shipping coal that all shipping agents for coal prefer to any other, that is, by barrow, wheeled on board on a stage, and lowered into the hold, and then wheeled in the hold to the place in which it is intended to be deposited; they prefer that to all other modes; they have tried others and given them up. The incumbrance I spoke of from the coal trucks on the quays of the Morpeth Dock arises from this. The coal is very often ordered to be there by agents who have the charge of it, with the expectation, as they tell me, of a ship coming for the purpose of loading it; the ship not arriving from various causes, we are encumbered with those coal waggons sometimes to the extent of a fortnight. In 1844, Mr. Rendel's plan was, in the first instance, that his low-water basin was to be 37 acres, now it is reduced to 26, but the great feature of alteration is, that in 1844 you will see docks marked upon the margin of the plan in classes. It was intended then that there should be a highway, using Mr. Rendel's own expression, in the great float, from which they were to enter those docks, but Mr. Rendel altered that feature of it to make it a dock itself. The basin has been curtailed in its size, but that is not so much the reason why I had occasion to alter my opinion, but it was that formerly it was made a highway to the docks, and the alteration of level did not then affect it in the same way that it does now.

Lieut. Hookey, 22 May, 1856.

Dredging in Morpeth Dock.

John Jones, 22 May, 1856.

John Jones, examined by Mr. Bramah.

I am a shipowner at Liverpool; I have the control, in some degree, of vessels belonging to other merchants at Liverpool. For a long period of years I was in the employment of the late Sir John Tobin, commanding a ship for him; I went to sea in 1813, and have been engaged, more or less, ever since continually, until I left off nine years ago. I am acquainted with Birkenhead; I have had ships under my control there. I know the various plans projected for the Birkenhead Docks. I have taken particular notice of the plans proposed by Mr. Hartley. I am of opinion that Mr. Hartley's plan is what we want for the trade of the Mersey, rather than Mr. Rendel's. I consider Birkenhead and Liverpool all one. I consider that it would be impracticable to keep Mr. Rendel's low-water basin as a basin; and that if it was so the confusion going in and out of that basin would quite prevent the trade going through into the other docks. If the wind is fair but light, with large ships, they prefer employing tugs; when the wind is strong they always come under sail, but if the wind is light they must have tugs, they cannot depend upon it. They never risk those large ships alongside the pier, under canvas, if they can possibly help it.

Docking ships at Liverpool.

There is a rule in the Liverpool Docks to prevent ships entering the gates under sail. That is lest they should do damage to other ships, and to the dock gates also; they are not allowed to sail in; they either go in by steam or are warped in. Ships, when I first went to sea, in 1813, of 400 or 500 tons, drew as much water then as ships of the present day of 2000 tons draw. There is Lloyd's rule as to building ships, that if a vessel is of greater depth of hold than 23 feet, it must have an orlop deck, another tier of beams, so they try to keep within those limits, to keep as near the mark as possible without having occasion to put those extra beams into it. It has happened, only once within my knowledge, that the closing of one of the dock gates at Liverpool has been prevented by an accident. That was an accident that might occur in all docks. I should say no docks ought to be without two gates upon them, the slightest thing may create an accident, a chip or a piece of wood, or the chain of the gates may break.

Landing-stage.

A landing-stage is about to be moored off the Prince's Pier, at Liverpool; it will not in any way interfere with the entrances into Prince's Dock.

Cross-examination

Cross-examined by Mr. Webster.

The landing-stage about to be moored off the Prince's Dock is for the Irish trade, principally for the landing of cattle, and for the sea-going steamers landing their passengers; the cattle are from the Irish and Scotch boats; also for the general traffic of the Mersey; I apprehend it will be a good deal used; I suppose a good landing-stage would be preferable on both sides; I think that this large landing-stage that the Corporation are putting there, will do everything that is necessary outside the walls for the present business of the

Mersey. My establishment is at Liverpool I have a share in about seven or eight ships; that is small for Liverpool; I do not suppose that one's knowledge of docks is dependent upon the magnitude of one's ship-owning; I have no other place of business than Liverpool. In practice 99 out of 100 vessels are brought in by tugs, and alongside the quay wall, for the purpose of docking. The general run of all large ships now I suppose will average about 200 feet. I have not ascertained how many vessels could be laid side by side in Mr. Rendel's low-water basin; I have not made any calculations, but that basin proposed there is not intended for ships of a 35-feet beam, it is not a place for them. *John Jones*, 22 May, 1856.

Re-examined by Mr. Bramah.

It is not usual to take ships into a dock abreast; it is impracticable; they go in one after the other.

Captain William Kemin Maughan, examined by Mr. Hope Scott. *Capt. Maughan*, 22 May, 1856.

I was principal dock master of the London Docks for upwards of 21 years; I retired from that duty in 1852. I have been consulted at various times on docks or dock works in various parts of England; at the Cardiff Docks, my experience ran over from 1841 to 1847. I was consulted on the Thames Embankment, on the Swansea Docks. I planned out and carried through the Newcastle Docks in 1855. In 1844 I gave evidence, very short evidence, at the instance of the Liverpool Dock Trustees, upon the Birkenhead Dock Bill. I have given evidence two or three times on the Liverpool Dock Bills, and am pretty well acquainted with all that has been projected there. I have had the docking and undocking of at least 40,000 to 50,000 ships, averaging above 350 tons each, and also the arrangement of them in the docks, and am in consequence well acquainted with the practice of docking ships and their management when in docks, as far as that experience goes. Mr. Hartley's plans have been laid before me, and I have taken them into consideration and brought my experience to bear upon them. I concur in the principle of Mr. Hartley's plan of locks between the river and the basin. There are two or three reasons why I concur in that system of dock entrances at Birkenhead; I prefer the substitution of communication locks between the river and the basin instead of the tidal basin as proposed in 1847, and the next reason is the reduced size of the basin from about 37 to about 8 acres. In that system of locks there is sufficient provision made for the accommodation of any probable amount of traffic for shipping for some years to come; I will state the proportions of the size of the locks as compared with the London Docks and the East and West India Docks. Mr. Hartley's plan, I think, gives 79,480 feet area in the communication locks between the Mersey and the basin; Mr. Hartley's 3 locks give an area of 79,480 superficial feet. Of the East and West India Docks I can give you the dimensions, if you wish, in detail. The West India Blackwall entrance, the Limehouse entrance, the South-west Dock Limehouse entrance, and the

Locks between river and basin.

Ships entering London Docks.

Capt. Maughan, 22 May, 1856.

Blackwall entrance, that is taking all the entrances into the East and West India Docks, the London Docks, and the St. Katherine's Docks, that is all the docks on the north side of the Thames, with the exception of the Victoria, all docks on the north side, are 63,923 feet. The total number of ships which passed through the locks in the before-mentioned docks in the port of London in 1851 was 17,651 ships, with a tonnage of 4,084,324. The number of barges and lighter craft which passed through during the same time amounted to 124,061, averaging about 30 tons each; that gives very nearly 4,000,000 more tonnage; that is the London Docks. The amount of business by the Shadwell entrance of the London Dock for 12 months in the same year, 1851, amounted to 2548 ships, 908,200 tons, together with 4500 lighters and barges; they would average about 20 tons each. The Shadwell Lock, whereby this traffic was conducted, is 180 feet long and 45 feet 3 inches wide, and the area of the basin with which the lock communicates is 1¼ acre. A scouring power, such as is proposed by Mr. Hartley, under the circumstances, with the assistance of dummies, if needed, will, I think, avail to keep that basin clear at a moderate expense; they will have very great scouring power, and only about 4 feet of water to sluice through—the tail water, it is generally called. By reason of the intermediate dock, the quantity of tidal water entering will be reduced by Mr. Hartley's plan from 37 acres, as first proposed, to 8 acres; as now proposed, it will be reduced from 27 to 8; but also it will be reduced from the 20 feet average tides which there would be in the low-water basin, to about 2 or 3 feet by Mr. Hartley's plan of locking. The lockage accommodation is so extensive it will permit all vessels to be locked in until they have reduced the water in the basin, of course according to the extent of lockage, and that may be in fair tides' work, perhaps equal to 2 or 3 feet before high water; the gates will then be all opened, and during the last hour of flood the ships will pass in without the slow process of lockage. That system will have a beneficial effect with regard to keeping the basin clear, because the quantity of tidal water admitted would be only the replacement of that quantity of water lost by lockage. As to scouring against any considerable head of still water in a state of comparative rest, against which the scouring power is to be directed, my practical experience leads me to this: I have tried it in various ways; I have tried it at Cardiff, in a dry basin, and at Shadwell with a paved entrance—that with a depth of 12 feet at low water there is no such thing as a scour: it is not known. You disturb the mud, but you cannot have a run of water. At the Shadwell entrance, with eight sluices through the lock gates, four of 3 feet by 2 feet, and four of 3 feet by 3 feet 2 inches, making 50 square feet, scouring was found impossible with depths above 8 feet over the sill of the lock gates. With an area in superficial feet of 50 over the whole sluices, and with a very good head of water behind them—say 23 or 24 feet of head—with a depth on the sill of the lock gate of 6 feet and

Scouring with dummies effective.

Sluicing at Shadwell.

under, the effect is to drive all the water through the lock, and far beyond the lock, with such velocity, that all the mud and filth is carried along with it; that is with 6 feet and below 6 feet, the scour is very effective without the dock; we have a stone invert just outside the dock up to the dock channel; as long as there is under 6 feet, or 6 feet, the scouring is very perfect; then it takes the mud and filth into the Thames. The width of the invert is about 47 feet; the transverse area is much greater. The result of my experience is, that having, at Shadwell Docks, sluices with an aggregate area of 50 feet, and a head of 23 feet, to effect the scouring through a channel of about 300 feet long, and 46 feet wide, it is very efficient up to 6 feet and under; at 8 feet our practical experience taught us it was perfectly useless to waste the water, and we never did; that was the result of experience. At Shadwell the sluicing was at dead low water, varying with the tides; we sometimes have had 3 feet of water—that depends upon the wind and the tides. From 1841 to 1847, I know all about Cardiff Docks. The basin is dry at low water; the sluicing power is through 3 culverts of 5 feet diameter, and 2 sluices in the lock gates, 4 feet by 18 inches; the head is 28 feet, and is supplied by a reservoir; a constant head of 28 feet above the under side of the sluices. The effect of that great scouring power was to undermine the pier-head walls; and yet, with the exception of the channel—and that very imperfectly kept—with a bar forming in the centre of it, the mud on each side of the basin was not removed by scour but by manual labour, by throwing the mud into the channel; that is the case, I believe, in Liverpool. Scuttling, I think they call it: throwing the mud into the part where the scour did really operate. Between the culverts and the pier-head, where there is a pair of gates, the effect was to wash out the channel from the culverts to the pier-head, but the mud in the basin could not be disturbed. I have always viewed it as a great thing in all docks—the preservation, as far as possible, of a permanent level, whereby the stages and gangways required for landing and loading are not disturbed, and the moorings always remain undisturbed; a varying level, of course, renders necessary the attendance of labourers on board at all times of tide, to slack off and readjust the moorings; particularly where you have a rise of 27 feet, as I am told they have in the Mersey, you must have people constantly attending. I think one uniform level is the basis of all dock establishments; that can only be obtained by locks. The effect of lockage on the great float would be very little if they have 130 or 140 acres; all they could lock in the course of a tide would make very little difference in the level; hardly appreciable, I should think. In commercial establishments like docks, we depend for revenue on the landing and housing of goods, and on accommodating all such vessels as bring such traffic to the docks. In the plans of 1844 and 1851 that has not been sufficiently attended to. The main question there seems to have been the consideration of coasting steamers and coasters to land and discharge

Capt. Moughan, 22 May, 1856.

Scouring at Cardiff.

Permanent and varying level.

Revenue from docks.

Capt. Maughan, 22 May, 1856.

cargo, to be brought by, or taken away by, the railways, out of which the docks were to have nothing in the shape of landing and housing. In the short days of winter, when the time of light is limited, the restriction to the departure from the docks would be from six to eight hours from a winter's morning to a winter's night, when the ships had to be brought from the float into the basin. I apprehend there would not be daylight to get them from the float into the Mersey before high water. With a low-water depth of 12 feet, if a vessel is to remain there all the ebb tide, she must go on to the ground; but, supposing they could take her out with the ebb tide, and she had to anchor, then comes the question, what will be the fate of a loaded ship in case she grounds before she can be got up to the locks?—there she must remain all the tide. Mr. Hartley's plan of locks between the basin and the Mersey will accommodate any amount of traffic. I cannot understand that it could be overcome; but even if it could be overcome, if any great pressure of business should arise, he is just in the same position then, by throwing all his gates back, as he would be with a tidal basin. It does not follow because there are gates that you are obliged to use them—you have the option. The inner locks have a superficial area of 16,900 feet, that is, the communication locks between the basin and the float. That is a greater area than any lock in London possesses. It would be very easy to lock in 8000 tons of shipping, and to lock out the same number during a flood tide that would last about four hours; that is only allowing six locks in four hours. With regard to the outer locks, I cannot understand that any trade can demand greater accommodation than those locks would afford; but if it was required, of course they could easily open the gates before they will open themselves—about an hour of high water—they will work themselves to a level by the water taken out by the lockage: they may be converted into a low-water basin, if the dock master thinks fit; though he has got the gates he is not obliged to keep them shut. Outer basins are mud-traps, nothing better. They are necessary evils; a curse to any dock master that has to deal with them. The smaller the better: that is a mitigation. I speak of them with a certain amount of animosity. There is such difficulty of getting rid of the mud; the increased amount of expense, and the irregularity of the bottom; you can never preserve an equal bottom. I would never go beyond the requirements of one tide. I would have a basin capable of holding the ships which may be expected to arrive in one tide, making a good allowance for them. There is getting the mud out; and basins are considered mud-traps because they are generally kept about 5 or 6 feet below the level of the dock. When a ship is loading to a considerable draught of water, it is very frequently necessary to bring the ship from the dock into the basin to complete her cargo; now when a ship is in the basin to complete the cargo, if you have not an outer-lock gate, until the water has risen outside sufficient to keep that ship afloat in the basin, all traffic will be stopped; and if that happens in a neap tide, which is very likely to be the case,

Mr. Hartley's entrance may be used as a low-water basin.

Outer basins are mud-traps.

they can do nothing at all; they are shut up for the time. They had remedied that at Cardiff by a large cost of money. They have got a new entrance and a new basin altogether, which has obviated that great difficulty; in fact, they could not carry on the traffic. They have what they call a half-tide basin. Unevenness of the bottom is not only a great expense, but a great inconvenience; the system of dredging the mud leaves the bottom of the basin full of hills and holes, that is the next difficulty to contend with, if a ship grounds in the basin. The expense of dredging in the London Dock, with an average rise of 5 feet of tidal water, is 200*l.* per acre. If the water in the Mersey is as turbid as the water in the Thames, and there is an average rise of 20 feet in the low-water basin, the accumulation would be four times if we have 5 and they have 20; but, allowing that the receding tide takes back with it all the mud that it brought in—which it is rather difficult to believe—then they must have double the quantity that they have in the London Docks. I believe the expense of mudding is considerably cheaper there, some 25 per cent., than it is in London—I mean the dredging, taking it out by dredging barges—so that it would be 300*l.* per acre. I assume that the low-water basin must be cleared by dredging: Mr. Hartley's, too, would cost the same amount; I consider that the minimum estimate; of course I cannot speak as to the quantity of matter held in suspension; I only say that if the water should be a little thick, as it is with us, they must be subject to that expense.

Capt. Maughan, 22 May, 1856.

Half-tide basins.

Cost of dredging.

The plan of 1844 contemplated side docks, and that the Wallasey Pool should be a highway to them. If the pool was to be drawn down 6 or 7 feet for scouring out the great low-water basin, which I understand was the plan intended, of course the water would be returned upon the flood tide; and the amount that would come into the basin—from which, of course, a deposit would take place—would be so enormous that I will not venture an opinion upon it. The water that is in the outer basin would be penned up into the float—shoved up. I am speaking of the increased deposit over the basin more particularly. The water that is taken out of the float would have to be supplied the next tide, which would bring in a large increased amount of deposit, according to the quantity of water taken out. It would be operative chiefly in the outer basin; it would send the water forward into the float, displacing the outer-basin water, and making its deposit in the outer basin. The side docks have been given up, I presume. I have spoken of the float as a large dock. The maintenance of the level must have its effect upon the limits of the scouring power; all the vessels in the float that were discharging or loading cargoes would be affected to the extent. You might draw down the water, but you could not draw it down much; you could not put the ships aground.

Deposit in basin and float.

Friday, 23rd May, 1856.

Capt. Maughan, 23 May, 1856.

Captain William K. Maughan, cross-examined by Mr. Webster.

Cross-examination.

I said I had given evidence upon two or three occasions against the project of Mr. Rendel. In 1844, at the instance of the Corporation of Liverpool, I then told pretty much the same story I have told now; I was examined again in 1848, at the instance of the Birkenhead Dock Trustees. In 1844 I appeared for the Liverpool Dock Corporation, and, after that, on two or three occasions, for the Trustees of the Birkenhead Dock; that is, for the Half-Tide Trustees, as they were then called.

Other plans for entrances

I suggested a plan in 1851. I suggested there should be a lock; that is not my plan; I had two locks; I am referring to Mr. Abernethy's plan now. I had a plan of my own. Mr. Abernethy and the Half-Tide Trustees were in concert. Mr. Abernethy agreed to alter his plan according to my suggestion. I said yesterday that I had been consulted upon several dock questions, and had been employed upon them; I did not mean as an engineer; I come here as a practical dock master. I gave evidence in 1851 before Admiral Beaufort and Mr. Stephenson; there was some little interlude; I do not know what it was; I was paid by the Corporation. I also gave evidence before a Committee of the House of Commons in 1852, upon Mr. Abernethy's plan. At the London Docks I was not engineer, but dock master. I have peculiar views about sluicing. I do not recollect that in any case I differed from the directors, or that the directors differed from me in any case. I had a plan for sluicing; the directors adopted that plan; shortly after that I was unwell, and, in 1852, the directors—having come to my sixty-fourth year—very kindly allowed me to retire from that duty. Mr. Rendel is now the engineer; he is making a lock of 300 feet, and placing the sills ten feet below Trinity datum. Sluicing with six feet upon the sill of the lock was very effective, but perfectly useless with eight. I call tidal basins a curse, mud-traps—necessary evils; they have several of them at Liverpool dry at low water, and they are a great expense. They have a great number of entrances and basins at Liverpool; I have walked through the Sandon, the Prince's, and the George basins at Liverpool. I never superintended the sluicing there. I said that a permanent level was a great desideratum in all docks. At the London Docks the wharfs are raised from 12 to 13 feet above the level of the

Relative level of quay and vessels.

water. They are constructing in the London Docks a new dock in such a manner that they may be enabled to keep the level of those large vessels down to the level of the quay. The permanent level of the London Dock is 20 feet, therefore they cannot let the water out below that. They are making a new dock at the London Docks; they are not arranging it in such a manner that they may keep the largest vessels

afloat, and allow of a great range in the fall and rise of the tide; Mr. Rendel is the engineer. I stated yesterday, and have so stated on the preceding occasions, that the sluicing of Cardiff had been an utter and entire failure; I believe Sir William Cubitt was the engineer of the sluicing at Cardiff. I do not remember Sir William Cubitt citing that as a successful instance of sluicing in 1844. Sir William Cubitt was the engineer; he had left when I knew Cardiff; the mud at Cardiff is rather of a heavier character than the mud in the Thames. They have made a new entrance at Cardiff, but they have not shut up the old one; the original entrance which Sir William Cubitt constructed, where this sluicing went on, is still in use. The channel from the dock-gate at which this sluicing took place is about 300 or 400 feet. I did not hear Sir William Cubitt, in 1844, say, "With regard to these things it was stated to be impossible to keep the entrance of the Cardiff Docks open, just as much as anything here has been contradicted flatly, and yet they do very well, and the entrance is exceedingly good." That was not the state of things in 1844 at Cardiff; I never heard Sir William Cubitt say it was, and it would make no difference to me if I had; here is the return in 1844, if you wish to have it. The area of the East and West India Docks, the Limehouse Docks, the London Docks, and the St. Katherine Docks, is about 141 acres; if there are 12 entrances—I do not make so many—we should have one lock for every 12 acres of dock. I think the docking of vessels in the Thames and in the Mersey may be compared; I think it does not matter where they are; the principle must be the same; as a dock master, I am of opinion that there is no practical substantial difference between the state of things in the Mersey and in the Thames as regards the docking of vessels. I think the principle is the same; they have more flow of water; I mean the principle by locks. Outside of the London Dock there is an area something like a basin, which may be called a tidal basin, and an area of about an acre and a quarter outside; a portion of the river kept free. As regards the outer basin of Mr. Hartley, he will have to resort to the dummies we have heard of; he will have to use those dummies on each side of the entrance. I think he will want the dummies to turn the water, and also a number of steam-tugs with rakes. Nearly the whole of the revenue of the London Docks is derived from the housing of goods; not four-fifths of the goods going to the London Docks are housed there; there is a great deal done by craft from dock to dock; but nearly the whole of the revenue is derived from housing. I regard the plan of Mr. Hartley pretty much as the same plan that I proposed to Mr. Abernethy, only he has more lock-room, and it is more expensive.

Capt. Maughan, 23 May, 1856.

Sluicing at Cardiff.

Similarity between Thames and Mersey.

Dock revenue from housing goods.

Captain Henry Foote, R.N., examined by Mr. Loch.

Capt. Foote, 23 May, 1856.

I am a captain in the Royal Navy, and I have commanded a steamship in her Majesty's service. My present occupation is that of dock master and secretary to the Newport Dock Company, at Newport, in

Capt. Foote, 23 May, 1856.

Monmouthshire; I have been in that position three years. I am acquainted with the system of lockage and working of the docks at that place, and generally. I have been at Birkenhead and made myself acquainted with it. I have been over the place. I have examined the various plans that have been proposed for giving accommodation for the trade of that port. I am acquainted with the existing authorised plans; I have also examined Mr. Hartley's plan; my experience induces me to give the preference to that of Mr. Hartley. I have examined his plan, and I consider that a system of lockage is far preferable to trusting so large an area of float to one pair of gates; it is much safer, and the work can be done much quicker. As a mode of entering the great float, and as a mode of introducing laden ships into the great float, I think Mr. Hartley's plan decidedly preferable to that of a low-water basin. It will facilitate the rapid passage of vessels into the float, by means of passing them into the half-tide basin; you may get a number of vessels into the half-tide basin; and pass them through at your leisure. The presence of vessels lying in the great low-water basin will materially interfere with the coming in of vessels for trade purposes. The rise and fall of the tide at Newport is very considerable; upwards of 30 feet; at Chepstow is one of the largest in the world; on the river Wye, at Chepstow, the rise and fall is somewhere about 55 feet. The dock at Newport is entered from the Usk; the waters of that river are very much charged with silt. I understand that the waters of the Mersey are also very heavily charged with silt. We have experienced considerable inconvenience at Newport from the accumulation of silt; our dock at this moment is silted up some six or seven feet. It is not in constant communication with the water as it rises and falls; but in consequence of not having sufficient back-water we are constantly obliged to use the tidal water, and not having a half-tide basin the tidal water is necessary for lockage, and consequently there is a very considerable extent of silting in the docks. Our entrance is by means of one lock, and for the supply of water to that lock we are obliged to use the tidal water in part; the consequence is, that at this present moment we have upwards of six feet of silt in the docks; we have no half-tide basin. Had we a larger back-water, such as is supplied by the great float at Birkenhead, for lockage, we should obviate that difficulty. I should consider it a very great point gained with reference to such a purpose; so much so, that we are now going to bring water a distance of nearly three miles for the purpose of avoiding taking in the tidal water. If the great low-water basin is to be used as a place of trade, I should consider the variation of level in the basin as a circumstance injurious to the purposes of trade. I consider a great object in a float or basin is to maintain a uniform level to work your trade with advantage. If you are constantly altering the level of your water, you are obliged to be slackening your moorings, and constantly altering the trimming of your vessels, which is very inconvenient. My objection is to the variation of the level, not to the

Advantages of Mr. Hartley's entrances.

Rise of tide at Newport and the Wye.

Silt at Newport Dock.

Permanent level.

circumstance of its being at one level or any other level. We could make our arrangements with reference to any level, should it be preserved. I have considered the desirableness of retaining a large body of water such as that of the great float with one pair of gates. It has been brought under my notice very recently; at one gate at Newport, only three days ago, I discovered seven of the main girders to be gone; and had we only had one pair of gates to have trusted to, the consequence would have been, that the whole dock would have been dry, the dock injured, and the trade ruined. I discovered it myself; my attention was called to it by this circumstance: I happened to be in London when the West India Dock gate was washed away the other day, the canal south entrance, and on my return to Newport, I examined our own gates very minutely. I should consider it a very great risk to trust the retention of the water of the Birkenhead Float to one pair of gates; the least thing would prevent the gates from closing. I have known at Newport either a piece of iron or rope getting between the gates prevent them from closing; and, if we had not a diving apparatus, we should not be able to close them at all, which, with one pair of gates, would be very inconvenient. I consider it very undesirable to trust such a large body of water to one pair of gates at any time, or in any dock. I would not recommend, at any time, having only one pair of gates. I should prefer a landing-stage opposite the Woodside Basin, similar to that at Liverpool, to a low-water basin for the purposes of trade, because it would retain a uniform level, and would not be affected by the sluicing. I should think that vessels could lie in the great low-water basin at the time sluicing was going on, but it would not be convenient for them to discharge their cargoes or work their cargoes at the time.

Capt. Foote, 23 May, 1856.

Single gate.

Landing-stage preferable to low-water basin.

Cross-examined by Mr. Webster.

Cross-examination.

It would not be convenient for vessels to lie in the great low-water basin while the sluicing was going on, because so great a current through the basin would be inconvenient. I could not charge my memory with the size of the authorised low-water basin. I was applied to, to give evidence upon this case about a month ago. I made the notes I have here myself from inspection of the plans. I have been at Liverpool; not with reference to this matter; I was there in February last.

Captain J. H. Christie, examined by Mr. Loch.

Capt. Christie, 23 May, 1856.

I have been employed in the Dublin Steam Packet Company's service for 16 years, commanding vessels between Liverpool and Dublin. I have been in the habit of entering and leaving the Mersey at all times of the year. I have seen the plans under consideration for the improvement of Birkenhead. I know the authorised plan of Mr. Rendel, and the plan of Mr. Hartley; I have considered the relative merits of the two, and I give the preference to Mr. Hartley's. I consider that it

Capt. Christie, 23 May, 1856.

would be much superior to the other plan on account of the double locks. I think the double locks a much better means of introducing vessels to the water within than the open basin of Mr. Rendel. My principal objection to the low-water basin is with respect to the working of vessels that would have to be loaded and discharged in the basin. For docking I consider Mr. Hartley's would be a very superior plan, inasmuch as if we wanted to get into the inner basin we could get in after half-ebb. The low-water basin would not be a convenient place to carry on trade; the rise and fall would be too great. It would be impracticable to get a long steamer round that corner into the Birkenhead Fork and up to the slip for passengers until the top of high water. With the vessel that I now command we are obliged to wait until within half an hour of high water to get into the Clarence Dock, on account of the strength of the tide running past. My vessel is 600 tons, and 180 feet only in length—the Duke of Cambridge; 12 feet of water would not be sufficient water to float a steamer loaded—not the steamer I command; she generally draws about 13 feet to 13 feet 6. I have heard what has been said on the subject of landing-stages; I think they are a very excellent means of discharging passengers from steamboats; I have sufficient experience to know the requirements at Liverpool; and I say that using a landing-stage is a very superior mode of landing or taking in both passengers and cargoes on board the steamers to a low-water basin; you can get up to them at all times of the tide. If the great low-water basin were to be used as an anchorage-ground that would very much increase the difficulty of using it for trading purposes.

Low-water basin unsuited for trade.

Cross-examination.

Cross-examined by Mr. Webster.

I am not aware whether there is any landing-stage proposed by the Bill. I heard that it was proposed; I do not know where they propose to put it; but I heard there was to be a landing-stage upon the Cheshire side of the river; I do not come here to give an opinion as to a landing-stage; I have not been told anything about it. I go to the landing-stage at Liverpool. I have discharged passengers and goods there; not heavy goods; light goods. We go to the Clarence Dock when we can get in, but sometimes when the wind has been blowing from the eastward, and we are too late for the tide, then we are glad to get alongside the landing-stage. The landing-stage at Liverpool is sufficient for all purposes; it is sufficient for landing and embarking passengers and light freight. If we had the large landing-stage at Liverpool, it would probably be sufficient for all purposes of passengers and goods; the present one is not used where ocean-going steamers are concerned. The new one that is building will be a very superior one to the present one, much larger; at the present one we can only get one gangway alongside. There would be every facility at the new landing-stage for getting heavy goods away through the town; you can land or take in cargo at

Landing-stages.

Capt. Christie, 28 May, 1856.

any state of the tide; when we get that landing-stage, it is a question whether some of the vessels will ever go into the dock. My vessel will have to go into the dock; but if my company were allowed, I am almost sure they would not take any vessels into the dock if they were allowed to discharge and load on the large stage; there is no objection to vessels going into dock. When the tide is running strongly either up or down, we cannot get into the Clarence Dock. I cannot get in if it is an hour and a half before high water, not with a long vessel. With my vessel of 180 feet long, I cannot get into the Clarence Dock within an hour or an hour and a half of high water; the tide runs too strong; it runs past the entrance at the rate of about 3½ or 4 miles an hour on the springs; I can get in better at neap tides. With all tides we either cannot get in, or find it extremely inconvenient to get into the Clarence Dock within about an hour of high water. The Clarence Dock entrance shelves off, both north and south. The outer gate is about 25 feet I should say from the river; when the wind is at all from the north-west, it is a very awkward entrance; we cannot get in when it blows strong. With an ordinary north-west wind, I would attempt to enter the Clarence Dock. I have made as many as six trips a week; my usual number is three voyages a week; making three double voyages a week, we miss going into the Clarence Dock about twice a month. As I stated before, it is the tide which prevents vessels from getting in. I have arrived at the gates before the gates have been closed and the ebb tide has been making down; the tide has been running too strong to twist the vessel in, we have tried and got the vessel partly entered, and been obliged to take it out again. When we have a strong tide, either flood or ebb, we cannot turn the vessel in; the width of the entrance is somewhere about 50 feet; the beam of my vessel is 43 feet; we have no great room to spare, it is a tolerably tight fit. The width of the authorised plan is about 350 feet; I could go into that low-water basin at any time except at low-water springs. My vessel draws, loaded, 13 feet 6, and light, about 10 feet 6; the average is about 12 feet; we are deep when we come in, and when we go out always deep. It would be more than half an hour in a month that we should not have water enough to get into that basin; I would not like to take the last two hours' ebb, for fear of taking the ground with a loaded ship. So far as the entrance is concerned, assuming it is kept at the depth proposed, I should be able to enter, except an hour just before low water at spring tides; at low-water neap tides there would be about 17 feet there. Vessels in the Mersey are frequently lying neaped for many days, not able to get into any dock at all. That low-water basin, with 19 feet of water at low-water neap tides, might be a convenience to them if they were compelled to be in the river; but it would inconvenience those which were coming in and out. I trade to Dublin; we lie aground there at low water. I should be afraid of lying aground in a low-water basin with 12 feet of water, unless I could ensure as smooth a bottom as there is at Dublin.

Difficulty of entering the Clarence Dock.

Access to low-water basin at all times.

Capt. Christie, 23 May, 1856. I should very much doubt their being able to maintain a smooth bottom at the Birkenhead Fork; if they could give us a smooth bottom, a vessel would not hurt aground much more there than she does in Dublin.

Re-examined by Mr. Loch.

It would be a very inconvenient matter to land goods with a lift of 30 feet if we were aground; we have sometimes cattle on board our vessels; unless we could remain at the slip, of course we must keep them on board until we could work the stage again; if we were at the slip, nothing else could get to the slip.

J. Wood, 23 May, 1856.

Joseph Wood, examined by Mr. Loch.

I am dock master at the Coburg Dock in Liverpool; I have been there four years. I was previously employed at the Clarence for nine years. I know something of docking vessels at Liverpool, both at the Coburg and the Clarence Dock. The Clarence Dock is entirely intended for steam vessels; the Coburg is for steam vessels and sailing vessels also. The largest steamers that ever came into the port came to the Coburg Dock, with the exception of the Persia. I have docked the largest ships that come to the port at the Coburg Dock; the Australian ships come to the Coburg Dock; there are some 2600 tons, and 280 feet long; the largest one is 46 feet beam, and draught of water 23 feet when she is loaded. She is one of the clipper vessels; we take those vessels into the Coburg Dock with perfect facility. The width of the entrance-gates at the Coburg Dock is 70 feet. At high water of an ordinary spring there is from 20 to 21 feet on the sill; it is 5 feet below the datum. There was one tide in the year 1854 that I sent out 16 vessels from the Coburg Dock at one tide, and took in 17; that is, 33 vessels passed in and out in one tide; the length of time occupied in getting those vessels in and out was from 1¾ to 2 hours. I could not state exactly the time. Out of those vessels there were four large steamers belonging to Mr. Mac Ivor. The gates of the Coburg Dock are in the river wall; they are not flush with the river. I should say they are recessed about 18 yards; vessels passing in and out feel the inconvenience of the tide. I have looked at Mr. Hartley's plan for a basin and entrance at Birkenhead; I saw it yesterday for the first time. I should like the entrance a little more towards the river, then I think I could manage with great facility for getting vessels into locks; the nearer the river we get them, the sooner the vessels get into the dock. Mr. Hartley's plan I should like better if I had the working of it; if his gate was placed even closer to the river. I should think it much disimproved by putting the gates further from the river; it is such a great distance from the locks. I should not consider it a convenience to place the entrance to a great dock so far back as that in Mr. Rendel's plan; it would go very much against my docking ships.

Work at Coburg Dock.

Gate should be near the river.

Cross-examined by Mr. Webster.

J. Wood, 23 May, 1856. *Cross-examination.*

The Coburg Dock is the southernmost dock but three; it has one pair of gates, which are pretty close upon the river. For the convenience of docking, we like to have our gates as close to the river as possible, with a curve along the river of about four points, so that a vessel can come alongside of the wall. We warp them in. We use steamers to bring the sailing vessels along the wall; I have used steamers to tug them into dock. I have sent out a tug-boat and towed them right into the dock when our gates were open; that is a very convenient way in such cases. If you can get a steam-boat a-head of them, and pull them into the dock, you get them out of the way the quicker. The great object is to get them out of the tide-way quickly. The tide runs pretty strong in the Mersey. I know the plan of Mr. Rendel. There would be no danger in taking a vessel into the low-water basin with a steam-tug at high water: I see no difficulty. That is a much more convenient way of getting vessels out of the tide-way of the Mersey than by handing them in by a warp; but suppose there are two or three vessels in there already—if there are four or five large ships in there, how am I to get a large ship there? I do not know the width of it exactly. The width of the Coburg Dock entrance is 70 feet; the depth 598 feet. If I had a low-water basin 300 feet wide at the entrance, and 2000 feet long from the Mersey, I could deal very well with three or four vessels with a steam-tug. There is never any difficulty of docking at the Coburg Dock. The Coburg Dock is so far south that it is, I believe, more convenient than the north docks; I never was docking at the north docks. We have inconvenience from what is called Pluckington Bank at the south docks. The sand accumulates, and sometimes rises 5 feet above the sill of the gate. The sill of the gate is 5 feet below the datum. When we have got a vessel alongside the wall she is inside the Pluckington Bank. The Pluckington Bank and the wall make a sort of harbour of refuge; when we have got her there we can get her in with a warp, if there is no steam-tug. That bank rising 5 feet above our sill, we cannot steam across there; but there is a nice passage—and a good passage—in a south-westerly direction. With a north-wester, we have a little sea there sometimes; north to north-west. There is a pretty good channel between Pluckington Bank and the wall; the sluicing from the gate makes that channel. The bottom at the Coburg Dock is sand and rock; we do not call sand and rock a good bottom. If the merchant or captain allows his steamer to be loaded too much it may ground. With a 20-feet spring tide we have 23 feet at high water; with a neap tide about 16 feet. Those steamers that draw 20 feet do not come in at the neap tides; they have to go out to prevent being neaped sometimes; they have to stay out until the deep water comes, that averages from three to four days. Those large vessels have shifted from our docks now to the north dock for more water. They do not come into our dock now.

Docking by steam-tugs.

Pluckington Bank.

J. Wood, 23 May, 1856

Re-examined by Mr. Loch.

The vessels can float always in dock if we do not run the water off too low; I always make it the practice to see what water the vessels draw in the dock, and I run down my water accordingly. The dock is 3 feet deeper than the sill. I keep water in the dock enough, if nothing goes in or out. When the tide is falling outside, if they do not get out of the dock at a certain stage of the tide, they would be kept in there until the tide was high enough for them to get out. A vessel drawing 23 feet would not float in the dock with an 11-feet tide. I would not run the water off to allow the vessels to ground; it is my business, as the dockmaster, to keep them afloat. The vessels have to leave the dock on that account, because, if they remained in the dock, they would be able to get off on a certain day; but if they remained there, they would be aground in the Coburg Dock.

W. Hughes, 23 May, 1856.

William Hughes examined by Mr. Merewether.

I am a master pilot, and have been acquainted with the Mersey thirty years and upwards. I know the state of the tides opposite Wallasey Pool. The dock gates in Liverpool are generally opened about two hours before high water, and shut at high water, generally; sometimes half an hour after high water. I have seen the gates sometimes open for an hour after high water. Ships are docked for two hours before high water until half an hour after high water on the Liverpool side. At high water it flows for about half an hour, and then, when it begins to ebb, it runs down; it runs down in shore always first. It is always running down in shore before it has done running up in the middle; the tide is running down in shore, especially in the spring tides, when the tide is running up in the centre. I have looked at this entrance of Mr. Hartley's; it would be a very good entrance to get into, with reference to the current; because, when you get close to the piers, the tide slacks close to the piers, and one thing is, it is better, because the entrance is so wide there. Pilots, under all circumstances, would prefer Mr. Hartley's plan to Mr. Rendel's, because the entrance is so much wider; a ship could, with a north-west gale, under any circumstances, when there is water, run into the outer basin; and, if there was sufficient water, she could go in and be locked through that lock. As a pilot, the first thing we want to do is to get the ship out of the river. The turn-in out of the river by Mr. Hartley's plan is wider than by Mr. Rendel's, and therefore I prefer it, because there would be less risk of striking the pier-head. When inside, either under Mr. Rendel's plan or Mr. Hartley's, our way is comparatively easy. I have heard that Mr. Hartley's plan is 420 feet, and Mr. Rendel's plan, I believe, is 350 feet; if that is the case, any ship at any time, even blowing a gale from the north-west, could take Mr. Hartley's entrance far safer than she could take Mr. Rendel's. A pilot's duty continues until she is inside the dock gates; the pilot's responsibility does not cease until she is inside

Period of docking and lull of tide.

Wider entrances preferable.

one of the wet docks. My ship would be most manageable in Mr. Hartley's plan, decidedly; for one reason, that if it was blowing hard from the north-west, in Mr. Rendel's plan, you would have a long space with a pressure of wind coming right down; whereas, in Mr Hartley's plan, you would be under the shelter of the piers and the walls, and you would be comparatively sheltered right round from the wind. I think it a material feature of Mr. Hartley's plan, that we should be sooner into artificial still water, where you would lie safe, than by Mr. Rendel's plan; I should venture to run into that outer entrance if there were several other vessels there, because the entrance is so much wider. If I was wishing to run in, and saw there were half a dozen, or three or four large vessels already there, I should venture to run in if I could see my way clear for sailing. I could see my way clear, because I could see my way clear right up the river. Half a dozen vessels might run in there; they could go in one after the other; and if there was a vessel—for argument's sake—200 or 300 yards ahead of another, she would sail in. The entrance is so wide—420 feet—that she could go either on one side or the other, for when you get close to the piers there is no tide; the tide ceases when you get within about 100 feet from the entrance to the piers. You would be in safety sooner by Mr. Hartley's plan than you would by Mr. Rendel's plan; safety meaning, in a pilot's mind, inside the dock gates. Mr. Rendel's entrance is a long way further off; it is a long way to warp up, and you would be a long while before you could get up there if it was blowing strong. I have seen it blowing so strong in the river that you could not possibly have got a vessel up that far; it is 2000 feet, I believe, from the entrance to those gates. The wind must be from a certain quarter in the Mersey or else she could not sail up there—it must be either a northerly or a southerly wind; but the prevailing wind of Liverpool is a westerly wind. Pilots are safer with locks, because when a gate is once shut, where there is no lock, a vessel going in there, if it is a place in which she would take the ground, she would have to ground most likely, because they could not get her out again; but if you are taking her to a place where you have a lock, you can lower the water and let her into the lock, and afterwards take her into the wet dock, which you could not do with one gate; therefore, as a practical man, I should prefer a system which had locks instead of a system which relied upon gates alone.

W. Hughes, 23 May, 1856.

Several vessels at entrance.

Advantage of locks.

Cross-examined by Mr. Webster.

Cross-examination.

You could not run with a westerly wind into either of the basins; not very well with a north-westerly wind; I spoke of running into Mr. Hartley's basin with the wind from the north or north-north-west. With the wind from the north-north-west, with a large ship, I would run into Mr. Hartley's basin; we can always stop the way of the vessel; we can always manage that; the wind would very soon stop her if it was north-north-west. My liability and duty as a pilot cease when the

Run into basins.

W. Hughes, 23 May, 1856.

ship is inside the gates, not where the lock or dock entrance begins, when inside a wet dock. We should have to go further for our money under Mr. Rendel's plan, and with greater risk. The pilots at Liverpool are appointed by the Corporation under the Municipal Act. (*a*) The gates at Liverpool are generally open about two hours before and half an hour after high water. A spring tide will fall in the first hour not more than from 2½ to 3 feet; in the second it would fall more; an ordinary 18-feet tide, a spring tide on the average springs, in the second hour would fall about 4 feet, that is 4 and 3, making 7, or say 8 feet. I prefer Mr. Hartley's entrance very much, because it is wider than Mr. Rendel's; I am told Mr. Rendel's is 70 feet narrower; the one is 350, the other 420 feet. My argument is, that Mr. Rendel's entrance of 350 feet is not so good; the Committee was referring to a large number, to three or four vessels at the same time all wanting to go in. If there were such a number of vessels it would give a little more space and more room and less risk of touching the piers, and be for the safety of the vessels in taking them into that entrance. Six vessels could not run into Mr. Hartley's basin all at once; I said one after the other. I do not know how many might run in at once; I never saw two vessels run in at once into any dock or basin at Liverpool in my life, except small river craft; they always go one after the other. So far as regards Mr. Hartley's entrance, I do not anticipate that more than one vessel or two vessels would run in at a time. I do not think two ships would run in at a time; I am quite sure that if two ships with two pilots were both near to the entrance, one would keep astern of the other until he had got in, that he might see the way into the entrance. My view of the way in which Mr. Hartley's entrance basin would be used for large ships would be, that there never would be more than one ship run in at a time, and that any other vessel which wanted to come in would shorten sail, and wait till the preceding vessel had got in; I would not have two big ships running into that entrance at once. The one would wait until the other had fairly got into the basin.

Fall of tide.

One vessel in entrance basin at the same time.

Re-examined by Mr. Merewether.

Ships of 400 or 500 tons generally come without steam, unless it is not fine weather, and then the steam is generally used to get them into the docks out of the strong tide. I have seen sometimes, with the prevailing westerly winds, hundreds of vessels coming in with no steam at all, except to assist them into dock. A great number of ships apply steam to get into dock; nearly all the large ships have steam to assist them getting into the dock.

By the Committee.—If the wind was north-west or north-north-west,

(*a*) This is not the case—the pilots are appointed under a special Act, 5 Geo. 4, c. 73, constituting a Board of Commissioners and a Pilot Committee; the Commissioners are appointed by the Town Council and Shipowners. *See post*, evidence of J. Cooke.

a vessel under sail, without the aid of steam, would sail up the river, and as she turned the pilot has the command of the canvas, and he would either haul in the top-foresail-brace or back the main-yard, and soon check her speed. I should go on if there was one ship lying in the basin. If there was one ship lying in a basin of 420 feet wide and 400 feet deep I should sail in with another lying there with that entrance; all you would have to do would be as soon as you got out of the tide to stop her way before you got up to the lock; because the moment you come along out of the river you turn the corner and are in the pit directly. I could take three or four or five sailing vessels into a basin of those dimensions. I could take in, I should think, four or five vessels of 1000 tons; if they were all bound there the pilots would use their discretion; if there was no room they would let go the anchor close to the entrance. I would take four or five vessels of that size into a basin under sail; there can be no question of the vessels going into that basin, because they would steer them alongside, and stop their way. I have seen nearly a dozen sail running into the King's Dock Basin, which has not near the width of entrance of that gate; the moment they get out of the tide you have every command upon them to haul them with ropes; although the entrance is that width, if there were a dozen ships on a flood tide, all bound to Birkenhead, they could all get into that basin. I should not mind sailing in with a vessel of 1000 tons, because the moment you get out of the tide you can stop her with ropes and warps; you are soon out of danger and into safety. A vessel of 1000 tons is from 250 feet and upwards; about 250 or 260 in length. With a basin of 420 feet wide and 400 feet deep I should not mind two vessels of 250 in length being run in under sail, because there is plenty of width; there is 420 feet of width from pier to pier.

W. Hughes, 23 May, 1856. Sailing into the entrance basin.

Number of ships in basin.

John Shepherd, examined by Mr. Merewether.

J. Shepherd, 23 May, 1856.

I am a master pilot, and have been acquainted with the Mersey upwards of thirty years. Of the two plans I should rather work a vessel into Mr. Hartley's basin decidedly; because the lock gates are nearer to the entrance; they are worked with less risk and less danger to the navigation of vessels entering the basin. I agree with the last witness in thinking it is better to have a wide entrance into this basin. With a ship of 1000 tons I should not be inclined to sail into Mr. Hartley's entrance; it would depend upon circumstances. I should not like to sail in with a 1000 tons vessel unless it was very moderate weather and mine was the only vessel approaching it. I quite differ from the last witness. I would rather go to Mr. Hartley's lock, the nearest, than warp all the way up to Mr. Rendel's one gate. The pilot wants to get rid of his responsibility as soon as he can, and get into dock. I am quite certain that Mr. Hartley's plan offers me that chance quickest. In getting into that dock I prefer locks to double gates, because the locks

J. Shepherd, 23 May, 1856.

can be worked earlier on the tide and later in the tide. I think a plan involving that system better than one with a gate.

Cross-examined.

Cross-examined by Mr. Webster.

I would not attempt to go in on a north-east wind; I might go in with a wind from perhaps the north, if it was very moderate and very fine, and my vessel was the only vessel going in. I beg to remark that it is not practicable with a ship of 1000 tons to attempt to enter any basin in Liverpool or Birkenhead under sail; it is quite impracticable. I am a pilot; the last witness is a pilot; the same Commissioners appointed us both.

Joseph Cooke, 23 May, 1856.

Joseph Cooke, examined by Mr. Merewether.

I am superintendent and examiner of pilots. The pilots are appointed by the Commissioners for carrying out the local Act; the Commissioners are jointly appointed by the ratepayers and others, who do not necessarily belong to the Corporation at all—masters or owners of ships; and the Pilot Committee are appointed out of those Commissioners. It is not at all necessary that the members of the Pilot Committee should be members of the Corporation.

Cross-examined.

Cross-examined by Mr. Webster.

The Commissioners are all Liverpool gentlemen; engaged in business in Liverpool; merchants, having large establishments in Liverpool. I was examined as a witness in 1852. I do not know what plan I was in favour of; I gave my evidence; I do not think it was in favour of any plan. I said that before a vessel could approach Mr. Abernethy's entrance there should be a warp to the wall, for the purpose of bringing a vessel up, if she had got way on her.

Peter Jevons, 23 May, 1856.

Peter Jevons, examined by Mr. Merewether.

I am captain of a steam-tug belonging to a company; the company has about ten sail of tugs. I am constantly in the habit of docking vessels. Almost all the large craft coming in to Liverpool use steam in docking. I looked at those two plans. The last plan of 1856 is a far superior plan for convenience and despatch in docking ships, or getting them in or out of dock. It is more convenient in two or three ways; it has a better entrance, and there is a less distance to take them to the locks. It is an objectionable thing to have a long way to get up to the locks, because it is further to take them; and another thing, it takes up time; in case there was not a steam-boat to tug them up there, it would take a long time to warp a vessel from the pier-head up there to the lock. It would take a longer time for warping or steaming either; there would not be much difference in steaming; the objection refers more to warping than steaming, as to time. If we got in round the entrance of Mr.

Depth of basin objectionable.

Peter Jevons, 23 May, 1856.

Hartley's basin, I could put the ship entering into the locks far easier than I could in the other, because it is the habit at Liverpool, in the way the tide runs there, to dock ships only on the flood. On a flood-tide we should lay the ship to the south pier, and turn her round the south corner, pass the rope ashore, and keep winding her ahead, passing the rope along the pier-head till we got up to the gate, and shoved her into the south lock. I mean if there was length enough; that is only in the case of locks—they lock them in the flood, whereas in Mr. Rendel's plan you have got an abutment there, to go to which is not fit to lay any vessel to at all. At the entrance to the large lock, there is a kind of corner abutment there that is not fit to lay a vessel to at all. It requires space to lay a large ship alongside there nearly as long as herself. They have a pier here: when you get round to the Mersey up to that point, you have to turn up here up to that pier, and then cast off there till you have space. That is up to the Egerton Dock; that would be docking on the ebb: where they dock one ship on the ebb they dock two on the flood. With Mr. Hartley's plan, when you have got round the corner of the south reserve, you have only a short distance to warp, and at once get into the lock; and at times you can come on earlier in the tide; and while you are docking one on the flood you can put two ships in the north lock on Mr. Hartley's plan, and begin before high water: as soon as the water rose on the sill, they could open the gates, and take and warp them out along the pier. The best time for a Liverpool pilot to bring a vessel alongside the outer pier, is as soon as he is sure there is water enough to float it—that is, to forward the work; as soon as there is water alongside they can take them alongside, and bring one up after the other. A pilot would not run the risk on the ebb if his ship drew 20 feet, and there is 21 feet of water at the pier on the ebb; he would not run the risk of putting the ship there with 21 feet water on the ebb, though he would do it on the flood.

Docking on flood or ebb.

Cross-examined by Mr. Webster.

Cross-examined.

At Liverpool, most vessels are anchored in the river; they generally get in the tide before; but if they are coming up they generally hold them out with the tug till the time. In docking ships in Liverpool, where we take one a-head we take twenty alongside. I should think it quite convenient to go with three or four vessels alongside into that entrance of Mr. Hartley's. I should have no objection to that at all; whichever way the wind was. You can dock on that side with a steamboat in all winds, whether it is weather or lee. We dock at Liverpool with all winds with steam. It is very rare that there are days when the weather is so rough we do not dock at all at Liverpool; I do not think there has been a day for the last twelve months but what there have been ships docked more or less; whichever dock they have to go to. There has not been a day for the last twelve months that a vessel has not docked at the north docks from the weather, to my knowledge.

Three or four vessels in Mr. Hartley's entrance.

W. O. Mossman, 23 May, 1856.

William Ogilvie Mossman, examined by Mr. Merewether.

I am haven-master at Hartlepool, and have had some experience of sluicing at Hartlepool. I understand that Mr. Rendel proposes to keep that low-water basin clear by a system of sluicing. With great deference to Mr. Rendel's knowledge as an engineer—and that knowledge I do appreciate—I am bound to believe, from the experience I have had in sluicing, that the low-water basin of 12 feet could not be kept open by sluicing only. That the sluicing powers at Hartlepool may take effect, the tides have to be very low; that is, they must either be at the zero of the standard guage or below, before the sluicing powers take any effect upon the channel, that is at low water. When the power takes effect, there is from 2 to 3 feet, not more, water over the deposit. There is some portion of the channel that the sluicing will not touch at all; that is shortly after the issue of the water from the sluices; there is about 300 yards of the tide harbour where the sluicing waters pass over that does not appear to be at all affected. That, so far as I can judge, from experience in the dock, is owing to the resisting column of water, that after the power has gone from the first issue of the water from the sluices that power ceases, and the water then flies to the top; there is a column of water runs at a considerable rate over the surface of another column that is almost dead below, until it extends to about 300 yards from the inner sluice, then it becomes consolidated into one stream, and it effects a scour. The commencement of the bank or bar is about 70 yards from the sluices, then it extends about 300 yards; the further end of it is about perhaps from 300 to 400 yards. The termination of the shoal I am speaking of will be between 300 and 400 yards from the sluices. The column of water has an effect until it meets with the resistance again from the sea, then it loses its effect. The depth or height of that column of resistance which, according to my opinion, produces this effect, if we take whole quantity, is only 6 feet in the original state of the harbour, but in its practical state, there will not be more than from 2 to 3 feet. A column of resistance of that extent produces the effect I have described; if that be right, a column of resistance of twelve feet would produce an effect similar in principle, but I do not know the extent that it would produce. I do not know to what extent the principle would produce the same effect; it might differ in quantity. The sluicing power might be in proportion to the greater resistance. I find at the termination of the entrance channel, where the bar exists, that immediately it reaches that distance where it meets with the resistance of the water, the same as sluices there would meet with the resistance of the water, there is a bar, and that bar we never can run down; and, in fact, I have never known any effect that the sluices may have had upon that bar beyond 18 inches; I think the greatest extent is 18 inches; then when we would commence there would not be very likely above a foot and a half upon the shoal. The

Sluicing at Hartlepool.

Bar formed at line of stilled water.

distance of the bar from the sluices is between 1200 and 1300 yards; but the sluicing waters are conducted through a narrow channel, approaching within a short distance of it; the channel below that is narrow, the same as it might be there, after you pass the entrance of the tidal harbour. There is a channel of about 300 feet. We do not find it convenient to sluice if there should be vessels in the way; we find that we are obliged also to suspend other operations, quay and harbour operations in the tidal harbour, while the sluices are acting; I may explain that the working of those matters is not under my jurisdiction, but that I know, nevertheless. *W. O. Mossman.* 23 May, 1856.

Cross-examined by Mr. Calvert. *Cross-examination.*

I have been at Hartlepool ten years; before 1846 I was in the service of Government, in the Surveying Department. I belonged to the Nautical Surveying Department of the East Coast of Scotland, under the Admiralty. My knowledge upon the subject of sluicing has chiefly been obtained at Hartlepool; I must say that I cannot say anything else. The length of our channel from the sluices down to the bar is between 1200 and 1300 yards. When the water descends from the sluice, it comes into what is called the tidal harbour; its low-water area will be somewhere about 11 or 12 acres; the high-water area is 17 or 18 acres; the outline of the harbour bulges considerably on the south side, but the low water area does not bulge very much; the low water area is very different from the outline of the harbour, and that is when the sluicing power is working. At the extreme of the tidal basin there is what they call a coffer dam; it is a wood erection. The middle part of the tidal basin at high water may be 500 feet across, I do not know exactly. The width of the channel that runs down through the tidal harbour at low water is about 300 feet at the upper part of it; below it gets narrower, as it approaches the coffer dam. The sluicing at low water takes place along a channel, with mud banks on the west side and quay walls on the east side; the bottom is not uniform. The sluices discharge somewhere about 10,000 tons a minute. We do not sluice every day; we should sluice much oftener if the tides would allow the sluicing power to take effect, which they will not, because the column of water is too great for the sluices to act with what I call the resisting column; that is, the column of water already in the channel is too great for the sluicing power to act. The velocity is greater between the coffer dam and the pier head than it is between the sluices and the coffer dam, because it is a narrower channel. We do not sluice unless vessels are aground, because there is the danger of doing damage by breaking them adrift; the water coming down would carry them away; it has done so, and knocked them all to pieces. One small vessel was carried down the channel and capsized; that was previous to my time, but since I have been there there have been two or three vessels got adrift and have done considerable damage; but when vessels go adrift, and I am there

Sluicing at Hartlepool.

Effect on floating vessel.

W. O. Mossman, 23 May, 1856.

superintending, the sluices are immediately stopped; the vessels drew 6 or 8 feet.

Re-examined by Mr. Merewether.

When the vessels had gone the deposit still remained there. The vessel had floated on the surface, but left the deposit at the bottom. The current from the sluicing is the same, I believe, in all cases of sluicing. You have an immense current running at the top, which any person not acquainted with the nature of it would think was also running at the bottom; but it is not. The surface waters run with rapidity upon the surface over a sluggish column of water underneath. That appears to me to be so from all the experience I have had at the harbour of Hartlepool. Taking all these matters and my experience together, with great deference for Mr. Rendel's ability in these matters, I do not think he will be able to keep that basin open, there is such an immense column of water for resistance there. *(The witness explained to the Committee, by reference to a plan, the sluicing at Hartlepool.)*

R. Brocklebank., 23 May, 1856.

Ralph Brocklebank, examined by Mr. Merewether.

I am a shipowner, residing at Liverpool, pretty largely engaged in shipping. I am a member of the Dock Committee, elected by the ratepayers. I was added to the Committee of Works for the purpose of considering Mr. Hartley's plans; not having been on the Committee of Works before, I believe I was added to that Committee more in my character of a shipowner than as a member of the Dock Commitee.

Committee meetings on plan.

We had many meetings of that Committee. I remember a meeting (16th of October) attended on special invitation by Mr. Hammond, of the firm of Brown, Shipley, and Co., agents for the Collins line of steamers, and Mr. MacIvor, the agent of the Cunard Company, and Mr. John Laird; those gentlemen were invited to favour the Committee with their suggestions. We came to the conclusion that Mr. Hartley's was the plan suited to the requirements of the trade. I believe I have looked at those plans with an entirely unbiassed mind, with the intention of endeavouring to carry out the object of the Dock Committee, namely, to carry out the Birkenhead Dock system upon the best system we could find; and I consider Mr. Hartley's system the best system.

Cross-examination.

Cross-examined by Mr. Calvert.

My own establishment is at Liverpool; we have no building-yards at Liverpool; our establishment consists of warehouses and a counting-house; we have a warehouse and one counting-house in Robert-street, and we have two warehouses in Bath-street, adjoining the Prince's

Plans of 1855.

Dock. Last year I gave evidence in favour of the construction of docks according to a plan then proposed by the Liverpool Dock Committee, which was to embrace an expenditure ultimately of about three and a half millions of money, with the view to afford accom-

modation for the entire trade of the Mersey at Liverpool for a further period, without taking into consideration Birkenhead at all. For the public, I think that is the best plan. There seem some advantages at Birkenhead. The advantages are in the extraordinary depth of water. I know the position of Wallasey Pool. The connexion of the Birkenhead with the Liverpool Docks makes no difference to my opinion. *R. Brocklebank.* 23 May, 1856.

Re-examined by Mr. Merewether.

Of the expenditure of 3,500,000*l.* last year, upon the Liverpool side, 1,000,000*l.* was to be for warehouses; all that expenditure was not to take place at once. It was to have spread over an indefinite number of years. There was no time specified in which it was to be expended; and, I believe, only a million and a half was for Dock works. I am not a warehouse proprietor; I am only a renter of warehouses. I feel in duty bound to look at this as a public matter, which an Act of Parliament has made necessary to be done; and I would do it, under any circumstances.

Monday, 26th May, 1856.

Thomas Hawksley, examined by Mr. Merewether. *T. Hawksley,* 26 May, 1856.

I am a civil engineer, living in Great George-street. I have had twenty-six years' practical experience in hydraulic works. I am the engineer to the Rivington Pike Scheme of the Corporation of Liverpool. I have directed my attention to Mr. Rendel's and Mr. Hartley's schemes for the Birkenhead Docks; one of the principal features of the two schemes, and the question for consideration, is the sluicing question; there is a considerable difference in that respect; Mr. Rendel's scheme is to have 18 sluicing apertures at the head of the forks or arms of his basin 25 feet area each, for the purpose of discharging a body of water into the low-water basin to remove the deposit. The deposit from the Mersey is a sand mixed with a considerable quantity of alluminous or argillaceous matter; when it deposits it becomes in a very short time considerably compact, almost agglutinates together; it is a debris produced by the rivers which flow down from Lancashire and Cheshire; it is chiefly produced by the geological formation of Lancashire and Cheshire; it is chiefly the land debris which is deposited after being washed down to the mouth of the river; and inasmuch as those rivers, except during periods of very great floods, produce very little upland water, that matter is washed backwards and forwards by the tide, and becomes deposited in any still, quiet corner, or wherever the velocity becomes re- Mersey deposit.

T. Hawksley, 26 May, 1856.

duced below a certain amount. When deposited it becomes exceedingly compact, and becomes quite smooth on the surface. In fact, it becomes so compact, that it cannot be dredged by a common dredging-machine; the bucket of a common dredging-machine slips over the surface, and they are obliged, in order to effect the dredging, to have points put upon the bucket, in order to rake it, to dig into it, and break it up by the raking efforts of the points; it is exceedingly cementitious. A pebble of considerable size may be moved by a velocity of water which will not have any disturbing influence upon this matter. I have seen it many times, not because I have been looking at it with reference to this question, but over a long course of years. The disturbing power of water would carry a pebble on, and leave this deposit untouched; and not only will do so, speaking theoretically, but actually does so. Nothing short of a very considerable, not merely disturbing, but tearing velocity, would move this deposit. It cannot be done otherwise than by dredging, and that not ordinary, but exceptional dredging; such, in fact, as is done at Liverpool, and obliged to be done; points must be put to the buckets for the purpose of dividing and tearing up this very matter. The maximum effect is intended to be produced at spring tides; the difference between the highest head and the lowest tail is 27 feet 6 inches; 18 feet 9 being the lift inside of the float, above the Old Dock sill, of the average springs; that is the mean of the year's springs.

Head for sluicing.

The float would be filled, of course, to that level by the tide, and then, when the tide receded, and got down to its lowest state of water, the level would then be 8 feet 9 outside below the Old Dock sill, and inside it would be 18 feet 9 above; of course the head to give the velocity with which to sluice would be the sum of those two quantities, or 27 feet 6 inches. The neaps recede only about 2 feet below the Old Dock sill, and they ascend to an average of about 13 feet above the Old Dock sill, and the difference at that time, instead of being 27 feet 6 inches, will, of course, be again the sum of the two, 15 feet. The means of neaps in the float would be 13 feet above the Old Dock sill, which happens to coincide with the minimum to which it may be reduced; outside below it would be about 1 foot 9, as an average, but we will call it 2 feet.

Velocity of discharge.

The velocity of the discharge from the apertures spoken of would be almost exactly 33 feet per second. The area of the apertures is 25 feet, and there are 18 of them in each arm; so that the area would be 450 feet in each arm, which, multiplied by the velocity of 33 feet in a second, makes very nearly 15,000 feet, in round numbers, per second for each fork; or 29,700 feet per second for the whole. That discharge is to operate upon a depth of 12 feet water, extending over an area of little over 400 feet in width. You may call the mean sectional area 12 feet deep, supposing the forks to be a little over 400 feet; that gives 5000 feet of sectional area upon each fork—that is, adhering to round numbers; that is at 12 feet deep. Dividing that 15,000 feet by that sectional area, will give the velocity in each fork, which will be 3 feet

per second, or 2 miles per hour; that is to say, that the water in the arm would be moved with a velocity of 2 miles an hour. That will not be effective for the removal of the deposit. At the neaps the head will be reduced to 15 feet—that is, 15 feet instead of 27 feet 6, and the velocity will be reduced to 24½ feet per second; and the discharge will, in round numbers, be 11,000 feet per second, instead of the 15,000. But at low-water of neap-tides, the water in the basin, instead of 12 feet, will then become 19 feet deep, because the tide does not run out so low in neap-tides as it does in springs, so that the sectional area will be increased from 5000 feet to 8000 feet, and the velocity would become reduced to less than a foot and a half per second, that is, to about 1 mile per hour. One and a half feet per second would only give you one-fourth the scouring power of 3 feet. The scouring power is always as the square of the velocity. That is to say, because 3 feet is twice one and a half feet, then 3 feet will have four times the scouring power of 1½ feet, and if it was 6 feet it would have 16 times the power of 1½ feet; and I may say that there is no law in physical science that is understood better in theory or in practice than that. Nothing but dredging will keep the low-water basin clear unless they could have a power of water very much greater than the power of water which has been spoken of; a power of water which, in point of fact, it would be impracticable to derive from this enclosed float. Supposing those sluices opened at the same time, they would reduce two-thirds of an acre of water a foot down in one second of time. Now, you have only 130 acres in the float, and therefore in three minutes those sluices would take down a foot of water from that large place, and therefore it would be impracticable to take out more water; indeed, I doubt whether it is desirable to take out so much as has been spoken of. Such is the velocity of the water issuing from the float, that although it results only in that very low velocity when spread out in the mass of the basin, that it draws off 1 foot of water from the whole of the 130 odd acres of float in three minutes. Supposing the sluicing going on at Birkenhead, in Mr. Rendel's basin, the motion of the water at the top will not be the same as at the bottom close to the aperture, but at about the distance of four or five lengths of the working head, the velocity will become diffused through the whole mass of the water; probably at about 30 or 40 yards from the entrance of the sluice the motion would become diffused through the whole mass, and be equal all the way through. I need only, I am sure, call the attention of the Committee to facts, that they must always have observed in the opening of the shuttles of a common canal gate, where you see the water, instead of rushing along the bottom, opposite to the shuttles, and continuing down a great distance, immediately begins to boil up on the surface, within a few feet from the sluices themselves; that arises from the enormous inertia of water. You cannot put the water in motion in consequence of its great weight; but the parts of dead water, which meet and become opposed to the issuing

T. Hawksley, 26 May, 1856.

Velocity of discharge at neaps.

Whole of water in motion.

T Hawksley, 26 May, 1856.

water, reduce the velocity of the issuing water; then the force which gave you that velocity becomes distributed over a large area. That goes on doing the same thing; the area keeps increasing over which the motion of the issuing water is spread, till at last it becomes diffused through the whole mass, and then the whole mass moves on exactly like a river; as the area increases, the force diminishes. And you may try it in another way: if you take the jet of a fire engine, and put it under the surface of water, you will observe, at first, that the jet moves along, through the water, almost like a bullet from a gun, but almost immediately afterwards it gets diffused. Suppose you put the nozzle of a fire engine below the surface of the water, say in the Thames, close here, and that you get a velocity of 50 or 60 feet a second from that jet, you will find that instead of that jet flying as it would do above the surface of the water for a considerable distance, perhaps 60 or 70 yards, that velocity is deadened at the distance of a very few feet, and at a distance of a comparatively small number of yards, it becomes diffused over the whole surface of the water and you get the smallest motion possible—you get a complete boil at a little distance from the mouth of the jet and then it becomes diffused. The statement that the water when it comes out of the sluices when at a very little distance would go to the surface and along the surface of the water, and that the other would not move, is a mistake. I will draw something like what I believe it will be in this case; that is the sort of thing (*producing the same, and explaining it to the Committee*). That water will proceed along the bottom for a short distance, for a very little distance, and then it turns up, and loses its velocity; having to deal with the inertia of this great mass of water, it begins to lose its velocity; it turns about in this manner, and forms curves of this kind, and at last the force becomes diffused through the whole mass; there is a great agitation at the surface, violence of motion, and so on, but that is the only effect.

Diffusion of velocity throughout the body of water.

Cross-examination.

Cross-examined by Mr. Calvert.

I will explain it again. The water hereabouts is put in violent motion, forming a sort of vortex, that is in consequence of the action here of this violently-issuing water turning the other water round almost like a wheel; and consequently at the surface we get a good deal of agitation, and a boiling and rolling backwards and forwards. That will not be confined to any particular portion of the water, but will produce a general effect all round it, to a certain distance; then, having attained that distance, the whole body of water moves on as if it were a river. I have frequently made observations upon the compact mass—this glutinous mass—which is washed down from the shores of Lancashire and Cheshire, and which comes down and forms a deposit in the Mersey; I have more particularly observed it for the last six or seven years. This matter comes from the clays of the new red sandstone, and other argillaceous deposits, which are distributed all through the red sandstone dis-

trict. I did not say it was glutinous matter, but I used the expression that it became so compact and so irremovable that it was almost as though it were agglutinised. I used the term cementitious: anything is cementitious which has the effect of uniting particles together, whether in a very fast form or otherwise, almost as cement would do; but I do not use it in the sense of hard cement. The mud of the Mersey is more cementitious than the mud of any other river I have ever seen; there is no comparison. I ought to mention that there is scarcely anything so immovable as sand and clay combined; the combination of sand and clay is more immovable than almost anything else. Comparing the Mersey with the Severn, the Mersey is the more immovable of the two. I know the Severn exceedingly well; there is no comparison between the two. When this stuff is moved in the Liverpool Docks it is taken away by being driven into the Mersey; I presume so; I have nothing to do with it myself; I believe it is; that is a proper thing to do with it. There is an amount of velocity, which is a very important ingredient; there is a velocity there of five or six miles an hour. The river Mersey is a perfect race: in fact, it is wrong to term it a river; it is not, properly speaking, a river, but an estuary. There is a large bottle, and Liverpool is situated in the neck of the bottle; when the tide comes in, the bottle being nearly empty, the water runs through the neck with amazing violence; when the tide goes out, and the level of the water falls in the channel, then the water rushes out of this bottle back again with similar violence, and that violence of course is quite sufficient to carry any of that matter to sea. That is quite a different thing from a nook or a corner, or any part where that violence does not exist; there you get a bank. I do not know at what time of the tide they now shoot this matter out; I am not the dock engineer; I do not know the fact, or whereabouts they shoot it. I cannot take upon myself to say that at the time they shoot it the velocity is greater than two knots an hour; but that would not influence my opinion the least in the world. I will tell you why: because, if you throw sand in water which is in motion, the water subdivides that sand, and it is easily moved; but if you allow matter to deposit upon a floor, out of the tidal water, and to compact itself at the bottom, that water not being in motion at the time, being sand of this description, as a matter of course it will become perfectly compact. Every person who has been at Liverpool must have seen it, and must know the fact. I have not attended to this subject in former years—not much; incidentally, when I have been at Liverpool, I have heard the question discussed. I never read any of the evidence of former years. I should not be surprised to hear that the terms glutinous or cementitious had not been used in former years; but I should be exceedingly surprised if nothing had been given to the Committees which would bear the same signification. As to the terms, they are my own; they are only illustrative of my own meaning. I have never examined the deposit of the Pluckington Bank, but, as a matter of

T. Hawksley, 26 May, 1856.

The Mersey an estuary rather than a river.

T. Hawksley, 26 May, 1856

course, I have seen it. I believe the deposit on the Birkenhead side of the water is not the same as the deposit upon the Liverpool side of the water; of course it is, to a certain extent, but I believe it is not so coarse. I have examined the Birkenhead side, and I have seen the Liverpool side, for the purpose of ascertaining that question. I have examined the whole, from Seacombe to Woodside, at various times, but I was last there about a fortnight ago. The deposit in the Woodside Basin is sand, with a considerable amount of clayey matter intermixed with it. I cannot point out where I find the sand mixed with the clay, but I think it was somewhere near what is called the Gridiron, somewhere here—it was very near the Gridiron. I did not walk in it. I found cementitious matter, consisting of sand and clay, round here, and I found it down against Seacombe, in both cases where there were sluices; and it was because there were sluices there that I paid particular attention to it. I found it just there, from that turn of the wall at Seacombe; I did not find it at any intervening spot; at that time the water was against the foot of the wall. I observed those places particularly, in consequence of those sluices being there; or to the north of the Woodside Basin, and to the north of the Seacombe Basin. I cannot speak to any other spot upon the Birkenhead side; I did not look at any others with this view, I only wanted to inform my own mind. I did not even think of giving evidence upon that part of the subject at the time. I speak to no other places, except as to the general character of the deposits in the Mersey. My instructions were as to the sluices themselves within the docks, and not as to the nature of the deposit. This observation was made when upon the Birkenhead ground, under instructions received from the Corporation of Liverpool. My instructions were to ascertain what would be the velocity of the water as delivered from those sluices, what would be the velocity of the water in the arm, and what would be the effect, in my opinion, upon the entrance; that is to say, as to whether I thought it could be kept clear by sluicing alone, or whether it would require drédging, or whether it would require the mixed processes of sluicing and dredging. The Town Clerk of Liverpool and Mr. Venn, his assistant, communicated with me. That was the first occasion upon which I received instructions from the Corporation of Liverpool upon this question. What coefficient I use in calculating the velocity is 6·5; that is the true coefficient for a sluice which is approached by a tube which is more than two diameters in the length. The experiments are perfectly precise upon that point. I may mention, also, that Mr. Leslie's experiments made a short time ago, and communicated to the Institution of Civil Engineers, give, I think, 6·6 by experiment. By experiment, it is either 6·6 or 6·7; but, however, it is an actual fact that, with a pipe of two diameters in length, the velocity, when taken in feet per second, is 6½ times the square root of the height, and that is precisely according to experiment. There will be no dispute upon that point, but I wish to explain it so that everybody may know how that is

Deposit at Birkenhead.

calculated. That is according to the true hydraulic theory. Experiments have since been tried, without reference to that theory at all, by other parties, and they produce those precise results. I refer to Mr. Leslie's experiments, because they are on a large scale. The formula for the calculation is as follows: 6½ times the square root of the height of the head in feet will give the velocity of the water in feet per second, under those circumstances; I conclude, that the greatest velocity that could be obtained in the low-water basin would not move the deposit, from observations made on the run of the water, as it issued from those sluices at Woodside and Seacombe; I am perfectly accustomed to judge of matters of that kind. I found that the water really would not move the matter at 3 feet per second. I observed that the mud was lying at that point, and continued to lie at places where I was satisfied that the water was running at the rate of 3 feet per second. I only ascertained it was 3 feet per second in the way I mention—by the eye; I am so accustomed to observations upon water that I am perfectly satisfied it was so.

T. Hawksley, 26 May, 1856.

Mud not moved by current.

Re-examined by Mr. Merewether.

I have seen repeatedly, though not for this purpose, this very small compact sand and clay deposited at the entrances of the docks on the Liverpool side, even where there were no basins in the entrances of the docks; and I found that the sluicing out from those docks did not remove it, except that it had made channels in it, as I observed in the Woodside Basin. I also made inquiry, not with reference to this case, but earlier, what they had to clear the mud away with; I was told they were obliged to dig it and dredge it. Not at the mouth of the basin, it was in the dock entrances. I made inquiry as being more important for my observation; it deposited in little nooks of this kind in the various docks and at such places as these; at the entrances outside the gates; the water from the sluices there had the same effect as on the Woodside Basin. The places on the Liverpool side where they discharged the mud into the river, and the time of the tide, are regulated by the 7th and 8th Vict., cap. 80, sec. 83:—"And whereas by the said recited Act of the 6th year of the reign of King George the Fourth, it is enacted, that if any person shall throw, cast, or empty any ballast, ashes, or other rubbish out of any vessel into the river Mersey, or the channels therein mentioned, or from any of the piers or wharves of any of the docks or basins of the said Trustees, into such docks or basins, or into the said river, except such mud or rubbish as may be taken out of the said docks and basins in cleansing the same, such person shall forfeit and pay a sum not exceeding 10*l.* for each offence: be it enacted that during the space of seven years from and after the passing of this Act, it shall not be lawful for the said Trustees, or any persons whomsoever, to cast, throw, or empty into the river Mersey, except into the mid-channel thereof between Seacombe and Egremont Ferries, any mud, sand, clay,

Deposit of mud from Liverpool Docks.

T. Hawksley, 26 May, 1856.

or other rubbish which may be taken out of the docks of the said Trustees in cleansing the same, nor to empty any such mud, sand, clay, or other rubbish, from any flat, lighter, or other vessel into the mid-channel of the said river between Seacombe and Egremont Ferries, except only during the first quarter ebb of the tide, nor to empty more than one such flat, lighter, or other vessel at one and the same spot;" that is for seven years, but I think the same practice is carried on now. Doing it only during the first quarter ebb of the tide, and only one flat at one spot, implies an excess of caution. I do not think that is necessary; because although mud were emptied out, and even at dead low water, the velocity of the river Mersey is so great at other periods of the tide, that it would sweep it all away. If the Committee will allow me, while upon this subject, I should like to call their attention to the river that is close by here; the Committee will find that there are banks in the river Thames, not very far from here, which are mud banks, although the river runs at a rate very much greater than 3 feet in a second—very much greater. The geology there is of a character to produce the sort of débris I have mentioned. Every one knows that the surface of Cheshire is clay; and also, that the surface of Lancashire is clay. There is a very large mass of clay—one description belonging to the new sandstone formation, and the other to the coal formation. The sands chiefly belong, although not entirely, to the sandstone formation; losing its force as the area over which it travels is increased.

Bar at meeting of water.

If the water from the sluices were met by the outer water—by water coming the other way—the effect, if the tide is running in, would be to throw up a bar of a particular character; if the tide is not running in, it will still make a bar, but of another character; the outer slope of the bar would be very steep if the tide were coming in, but the outer slope of the bar would become flatter and flatter if there is no tide coming in. I have paid great attention to that subject both in England and abroad, and I know quite well the effect of rivers in creating bars at their mouths; and this, for the time, is nothing but a river, for at the time the sluices are open, it becomes a river. The resistance at the point of contact between the two columns would not create any disturbance there. It is not a question of disturbance—that is, the operative effect. The disturbance arises from the inertia and great weight of the water which is to be set in motion by the sluicing power. There are few things more difficult to move than water in a state of rest; that is the reason why, if you throw a stone upon the surface of water, at an angle of 5 or 6 degrees, the stone, instead of penetrating the water, jumps up again. The wind disturbs it, but that is by the continuity of its action. The effect of a stone rising again, or of a cannon-ball shot along the surface of water bounding up, is in consequence of the great inertia of the water which it meets at a certain angle. If you let a heavy weight fall upon the water, it will only go down very slowly to what it would through

air—that is partly in consequence of the inertia of the water. I have given the maximum and the minimum, of course as the tides vary between the two the velocity would become more than the minimum and less than the maximum; it would be between; the head is constantly lessening; the head will coincide with the level of the tide. I cannot state as to which of the dock entrances at Liverpool I was informed it was necessary to dredge at; it is certainly necessary to dredge at the dock entrances; Mr. Hartley told me of this dredging or sluicing. *T. Hawksley,* 26 May, 1856.

By the Committee.—This deposit consolidates very rapidly indeed, and from the facts which I have observed in the dock entrances at Liverpool, I should say that it consolidates almost every tide. I did not mean that all the matter brought up by the one tide will settle there and consolidate, but I mean that the matter which descends through the water in those nooks levels itself in such a compact form at the bottom, that it would soon become immovable in the sense in which I have used that word before, that is, immovable when the range of velocity is from one and a half to three feet per second. The deposit would take place gradually, becoming less towards low water, and then increasing again towards high water; that would be one complete tide. I ought to explain upon that subject that the time for this process will be from low water to low water again, because the sluicing will take place at low water, and then, when the water commences to rise, it brings with it a large quantity of this aluminous land, which becomes gradually deposited; the tide then descends—it is coming down from the upper part of the country, the water which has been filled into this bottle is coming back again—and it is bringing with it other matter of the same kind, and that is also deposited; we know that practically to be the case, because so large is the quantity of this matter that is brought up from seaward, that, if it were not so, this large bottle, which I have mentioned before, would become gradually filled, which it is not. I begin by taking Mr. Rendel's low-water basin, and assume that its floor is clear; the operation of deposit during the first tide which shall occur will be as follows: Take from the period of sluicing to the period of sluicing again, that would be 12 hours; the tide then begins to rise, and the water comes in from the sea and brings with it a very large amount of this silty matter which has been deposited, or, if there had been time for it to rest, would have been deposited upon the bars and shoals and banks at the mouth of the river Mersey; it brings all that back again with great rapidity up the river, the water flows into this basin, and becomes still, and when it is still it begins to drop this matter which has been suspended in it while the water is in motion with a certain amount of velocity; at last high water arrives, and the tide begins after that to flow back again out to sea, but in flowing back again out to sea it also contains a great deal of similar matter, and that matter is carried back

Compact deposit.

Process of deposit.

T. Hawksley, 26 May, 1856.

again out to sea. Now, unless we could suppose that the water in this basin was perfectly stagnant, and was not replaced by other water during the interval between tide and tide, sand of a similar description will be deposited upon the ebb as it was upon the flood tide, but there will not be so much deposit upon the ebb as upon the flood. During the process of the ebb there will be an inward current from the Mersey into that basin, but it will not extend very high up. There will be a constant agitation, although the water is descending, and is falling out here, still other water, in consequence of the waves and the action of the wind, will occasionally go in here, and then will come out again, and go in again, and work backwards and forwards in this way, all the time the water is coming out, and will make deposits during the ebb at the pier; and in the other parts of the basin it will chiefly make deposits during the floods. No portion of the deposit in the basin, which has occurred during the flood, will be removed during the ebb; for this reason: the motion outwards—this water having to be evacuated once only during six hours—is so slow, that it will take nothing out; those few hundred yards will have to be evacuated in six hours, therefore the motion out is very slow. The second period of low water will have arrived, finding in the basin the amount deposited during the flood untouched by the ebb. I cannot tell what the extent of that deposit would be in a tide; I have not made any observations, nor have I the means of making observations. The deposit will harden in the course of the flood sufficiently to resist the effort of the ebb; in fact, there are deposits in the basins leading into the docks at Liverpool, and those basins are placed under circumstances analogous to this entrance. They have not the same sluicing power; but I was asked as to the effect of the ebb tide in clearing out that deposit; it does not clear out that deposit. The centre of the bed of the Thames is, I think, clear in the sense in which we have been speaking of the deposit; I think it is not clear up to low-water mark; the mud banks are those which intervene between high and low-water mark; chiefly where the steamers cannot agitate the water, and where the beach ranges out of the reach of the wash; but there are some going below. The mean flow or rate of the current of the Thames varies in different parts; it exceeds two miles an hour in some places; it runs through Westminster-bridge faster than that; my impression is, its velocity is about 6 feet per second; that would be four miles an hour. I think at Waterloo-bridge the tide is frequently more than four miles an hour in the centre of the river. I think that the sluicing would not remove the deposit which will have occurred during the flood; the basin would very rapidly, in my opinion, fill up; I have no means of fixing the time. There is a large amount of deposit takes place in other places, and I suppose it would take place there in about equal proportions. The Woodside Basin has become shallower by about 6 feet during the last few years; I suppose that would be something like the measure of this. The deposit of the flood

Deposit in basin during the ebb.

Velocity of the Thames.

is not removed by the ebb in the corners; it is in the river, of course; that will apply to a natural low-water basin as well as to an artificial low-water basin. A natural low-water basin does not exist in cases of this kind except by artificial means. Natural low-water basins, in which no artificial means are used, do stop up, exactly in the way in which warping takes place in Lincolnshire and elsewhere. Large quantities of land are formed by making an artificial bank, within which the water comes and leaves a deposit, and so the land grows up. I do not know of any natural low-water basins anywhere on the coasts of Lancashire and Cheshire; except those of the kind I have mentioned, either with pouched basins or basins with rivers at their heads. The pouched basins are the cause of many natural harbours, where the water comes in, as it were, through the neck of a bottle, as I have described here.

T. Hawksley, 26 May, 1856.

Natural low-water basins.

Charles Mac Ivor, examined by Mr. Merewether.

C. Mac Ivor, 26 May, 1856.

I am a merchant at Liverpool, and agent for the Cunard line of American packets; I am the managing partner of the Cunard Company at Liverpool. I am owner of steamers trading to the Mediterranean and a great many places. I was one of the three called in by the Liverpool Dock Committee to give our opinion upon Mr. Hartley's plan—they were Mr. Laid, Mr. Hamilton, and myself—about the middle of October last year. I am not, and never was, upon the Dock Committee. I fancy I was called in because there is no party in the United Kingdom so largely interested in the practical working of steamers as I am myself; in using the word "I," I wish you to understand that I simply use it not egotistically, but meaning that it is an undivided authority in Liverpool; that there is no other party in Liverpool has to do with our line but myself. I do not care a fig about either the Corporation of Liverpool or the Dock Trust; I have nothing to do with either of them so long as they do not exclude me from the docks; that is the only interest I have in either of them. I know nothing of Mr. Rendel's plan; never heard it until very lately; I did hear it, by-the-by, at an interview—I will explain that afterwards. I examined as much of Mr. Hartley's plan as was shown to me; the entrances such as I see it there. As near as I remember, it was proposed by Mr. Hartley at the time that his depth of water should be 10 feet below the Old Dock sill, and 80 feet gates. I remember that Mr. Hartley gave as a reason for that, the difficulty of being able to sluice or keep the entrances clear; however, by the suggestion of parties, myself included, we strongly urged the necessity of wider gates, at all events, and the present plan is now 2 feet more than was then proposed, and 20 feet wider; that is the difference between what was then proposed and what it is now. I do not see what motive any one can have but getting the best workable thing; the Dock Committee are not interested as shareholders; they are not a trading body at all; they are not interested in any shape or way that I can see, in preferring one plan over another, except as a matter of judgment.

Deeper sills and wider entrances suggested.

C. Mac Ivor, 26 May, 1856.

I should consider that those gentlemen with whom I was associated upon that occasion were considering the best for the trade of the Mersey. The Mersey is not a place to be tampered with. I have had every-day experience of the Mersey, probably more so than any man in Liverpool, and I would most unwillingly adopt anything experimental; when I use the word experimental, I mean a thing not likely to answer, or about which there were great chances of its not answering, or of which the probable result could not be predicted with safety. I consider a vessel perfectly safe when I get her into the Mersey. I will give you my short view of the plans which are now before you: I have no interest, as I said before, beyond the accommodation which our vessels receive in the Liverpool Docks; I have no interest in any railway beyond the South Eastern Railway, which is out of the way altogether, nor am I actuated in any shape or way by the interests of my firm. If all the property on both sides of the water belonged to me, and I were to sit down to adopt a plan which would be practically useful, I would take Mr. Hartley's plan in preference to the plan which is there (Mr. Rendel's)—I do not know whose plan it is—in preference to the longer low-water basin. We will take such a ship as the Persia of ours; she has just arrived; her tonnage is upwards of 3000 tons, her length 360 feet, but 400 over all; I think there is no affectation in that, for, although I was a party to the dimensions of that vessel, she is only one of half a hundred vessels I have had to do with; she is as nearly as possible 360 feet keel and fore-rake, but 400 over all. Captain Judkins is the commander; he has been a commander in that line for the last fifteen years. We have so much confidence in him that we have given him charge of this ship, which I do not consider any sinecure for any man to manage. He would not be there if he were not equal to the best that is known. It is difficult to explain to people who do not know the thing as practically as I do myself; but I should take in the Persia with very much less risk in every way, and with ease, into that dock, when I could not do so into the other; and I have proof of it in the way that that ship docks in the Sandon Basin; the Sandon Basin forms an entrance to the Huskisson Dock: and as to this said Huskisson Basin, when you get into it there is a constant whirl; and, in fact, there are two or three different tides from the time the tide is, as you may say, half flood. Now the principle of docking such a vessel as the Persia is, that whenever there is water alongside of that wall, with the tide running up, she would run along the north wall; you would say, if you had charge of this dock here, that we should go there and then enter. I say no such thing; you could not enter; and, if you would enter with a ship of that class, you would wait until within an hour, or probably half an hour of high water, say an hour at the very soonest, before you would attempt to dock her. Now get a vessel round that point and she is into the lock at once, and no more about it; but get her into this basin, and you are just where you were when lying outside, perhaps a good deal

Docking of the Persia.

worse; I say a great deal worse. That is a wall without a single projection upon it, which you can use with a wind from the northward. I do not think it would be an easy thing at all to dock any vessel of considerable length in this dock. In this very Sandon Basin, at the present time, on Saturday, this vessel required two steamboats to help to take her into this said basin. Now, if there had been no basin at all, we should have docked much easier; we should have got round the point and into the lock, and there would have been no more about it. The locks are nearer the entrance to the docks; my own idea is, that that is sufficiently far in to take us pretty well out of the run of the tide in one case; and getting once round that corner we are easier docked. We should simply go in, in place of having to go into the basin. In that dock we could dock her without any steamboat at all, and there we could not dock her without two steamboats. I am speaking with a certain amount of knowledge, which it is no use trying to convey to you—I mean nautical knowledge; but I would not take the other plan at all, if it were left to me simply as an individual to determine upon; that is relying upon my own experience of docking vessels in Liverpool.

C. Mac Ivor, 26 May, 1856.

Locks in preference to basins.

Cross-examined by Mr. Webster.

Cross-examination.

Mr. Hartley spoke of the engineering difficulties of making a wider gate with a deeper sill. I said we start fair, give us the deepest sill you can; Mr. Hartley said that if he were to make a sill deeper than what he was then talking of, he would require to make a gate 80 feet wide then. I said, as a question of which is best, give us 100 feet gate, we would rather have a less draught of water. Now we have got 2 feet more. It is of great importance to us to have as deep sills as possible; every foot of sill is a matter of considerable importance for the accommodation of vessels of the first class; to explain it in this way: if you take that gate, suppose Mr. Hartley's gate, with six feet more water, say, than that contains, then I should, as a matter of course, prefer it to what it is with less draught. Mr. Fowler is manager of a department with me; I saw his evidence in the paper last year, upon the subject of making docks at the north. We consider those docks of very great importance to us. We should require the whole of them ourselves. We get our coals from Wales; we have about 500 vessels a year bringing coals to us from Wales, equal to about 1½ in a day, and that is not considered our great business at all; it is only a little bit of it. For the coaling of our steamers we employ a very large freight from South Wales. My attention has been called to the facilities which would be afforded for coaling vessels in the great float. I have been trying to get coal brought cheaper by rail from the other side, and have not been able to do it, and I do not believe I ever shall, by the Birkenhead Docks. We are now getting coal at 5s. a ton by sea, and I have arranged such a system that I believe the freights will not get above 6s. or thereabouts. I know, as a practical fact, that the railways will not carry to me for less

Every foot of sill important.

Cost of coals from Wales.

C. Mac Ivor, 26 May, 1856.

than 8s. or 9s.; therefore, I think, from present appearances, there is no chance of my getting coals in any great quantity from North Wales. I am bringing some, at the present time, down that side by railway; but that was at a time when the freights were high. So far as I can see at present, whatever they may do at Birkenhead, as regards the coaling of our steamers, we can beat them by our freight from South Wales. Coal-fields may be found nearer to Birkenhead than they are at present. I am speaking of what we can do at present—taking the coal from the same place we are at present; but by-and-by, of course, the railway may discover coals nearer to them, when they may be able to bring coals cheaper than we can do by sea. Our coals come at present from Cardiff and Newport. I will make a contract with any railway company who will bring coals to the extent of 50,000 tons a year, at 5s. a ton, from Cardiff or Newport.

Coals by railway to Birkenhead.

Captain Charles Judkins, examined by Mr. Merewether.

Captain Charles Judkins, 26 May, 1856.

I am the commander of the Persia, the largest steamship, I believe, now floating. I have just come home. I do not think any one ever came so quick across; nine days and five hours from New York. She was nine days, eight hours, forty-eight minutes into Liverpool river; but I had to be three hours and a half at the Bell Buoy on account of the fog. I could not get into the river. I have been commanding steamboats for sixteen years; every steamship the Company has now I have commanded except two, I believe. I know the Mersey as well as a steamboat captain should know it. I never saw either Mr. Hartley's or Mr. Rendel's plan till this morning. I should give the preference to Mr. Hartley's, on account of my getting easier into the entrance with Mr. Hartley's gates and his lock round the corner. In docking a ship from the corner of Mr. Hartley's plan, we should require a very little length of hawser to take her into the entrance of this gate; and when we got the vessel from the corner there, we should be inside of that wall, and be perfectly safe, without any rope, whereas in the other, we should require a great length of hawser; and hawsers will only resist a certain amount of pressure put upon them by a large steamer like the Persia, and if anything happened to her she would drop into the corner of the fork, and with the wind blowing from the northward I would defy any man to get her out without her steam. We never dock without warping; as to coming up the Mersey, turning the corner, and steaming right up to the dock, I would not risk such a ship as the Persia, for this reason: I must first take my turn in the river to get the entrance open, and you cannot without a certain velocity steam in; the ship would not steer the moment she got out of the tidal water and got between the walls—she would immediately lose her steerage-way on the helm which she had in the river, the power of the helm would be reduced very materially, in fact; probably, then the ship would not answer her helm in the distance between the two walls; and then

Warping essential in docking.

another thing: going in with that speed upon us, who is to be certain that my engines will go back the moment I want them? She would knock the gates down, or whatever there may be, and damage herself; the motion of a large vessel like that is so great when steaming, that you cannot get her stopped in a moment of time, the same as you can a small boat. The shorter distance we have to go on turning round the corner, the better for the steamer, and the sooner we are in between the walls, or the two walls, the better. The Persia could not attempt to come in bow foremost, she would come in stern foremost, and go out bow foremost, otherwise, you could not turn the vessel if you got her there; and when she was coming out again, you want the helm to act upon her the moment you come into the river, to avoid vessels that are running across her bow, or fifty things. *Captain Charles Judkins,* 26 May, 1856.

Cross-examined by Mr. Calvert. *Cross-examination.*

I saw those two plans this morning only, at Mr. Shuttleworth's office; nobody explained them to me, any more than they showed me the two plans as I stood there; there were two or three gentlemen there—Mr. Bold was one, and Mr. Hartley was another. They showed me the two plans, and asked my opinion upon them. We find it difficult enough, with the small space we have at Huskisson Dock at present, to get the ship well up to the lock when it is blowing a moderately westerly wind; it takes us on the other side, when we are coming out; leaving our position from the pier, the moment we slack our warps away, the ship goes to the other end of the dock, and it is *vice versâ* going in. From what I see of it here, I am between two walls in the length of the ship, the same as we are now in the Huskisson Dock. There is no lee under that wall, the vessel is so much above it; it is only from the warehouses we have that shelter now. There would be a difficulty in going in a straight line from that corner, at the entrance of Mr. Rendel's Dock, straight up to the gates opposite; I would not attempt to take a ship in, without warping her all the way along the wall, keeping her up close, and moving the hawsers from time to time; we should warp along by the hawsers; we always use the steam with the hawsers to keep her in position. We find great difficulty at all times in warping those ships; there would be a great difficulty if I was caught by my quarter coming in with that vessel, if the wind blew on the quarter or the stern, and my vessel went in upon that westernmost corner of that port; it would require me to get the hawser out and a tug-boat, to tow me up straight again before I could go on. If I was taken with the flood-tide, with the wind from the northward, after rounding that corner, no man could get a hawser long enough, and if she fell away from the wall, and took her stern right in upon the opposite corner, I should have great difficulty in getting her into position again. In the other case I have got my warps out, which do not require moving; the very position they are placed in upon my first turning the corner, the very same position will answer *Difficulty of warping.*

Captain Charles Judkins, 26 May, 1856.

that purpose, until we get the two paddle-boxes inside the piers, and then the difficulty is over. We always keep the bow-hawser in, and by the time the vessel has got her paddle-boxes in at the corner outside the bow-hawser is a check; they can keep it, or let it go according to circumstances. We should manage the entrance in either case by warping; but there would be a shorter distance to do it by Mr. Hartley's plan than by Mr. Rendel's plan. That is the advantage; the great difficulty, for instance, in coming out of the Stanley Dock to go right through to the river is because of the absence of the wall, and the basin intervening so far down that the ship has not way enough to answer her helm; and from the constant eddies of the tide, we find great difficulty from that very fact, after putting on full steam, to avoid hitting the two walls there. We keep the steam moving the paddles; this is the Sandon Dock; when we come out of the Sandon Dock, we come out of this basin; the wind and the tide and the constant turn of water there is in this basin drive us down upon this corner, and we cannot get clear of it without a steamboat, which we have always upon our quarter. I propose always to warp in; I would not turn the engine without a warp upon her to check her.

F. A. Hamilton, 26 May, 1856.

Francis Alexander Hamilton, examined by Mr. Merewether.

I am a merchant at Liverpool, and a partner in the house of Brown, Shipley, and Co. We, the firm to which I belong, are the consignees of the Collins line of American mail packets. I was called in by the Liverpool Dock Committee to give my opinion upon the plan proposed by Mr. Hartley. I think Mr. Hartley's scheme adequate to the necessities of that trade. I am not an engineer, or a practical man to that extent, but I have watched ships going in, and given a good deal of attention to it, and I say I feel certain that if it was left to me, Mr. Rendel's plan is the one I should never dream of. I should think it was fraught with danger, and I should never send ships in; I should be afraid to do it unless it was very calm and a very moderate tide, and a great many favourable circumstances, but if the wind were either high, or if it were blowing hard or strong, I should be afraid to risk it.

Cross-examination.

Cross-examined by Mr. Webster.

I only heard of Mr. Rendel's plan a few days ago; I had heard, of course, of the original plan some years ago, not to know what the plan was, but the first time I heard it explained was about a week ago. I am aware that it was supposed at the time that Mr. Rendel's plan would give us more water than we had at Liverpool; I mean a greater depth of sill; that is of this much importance, that since January, in Liverpool, we have not been able to put a single ship of the Collins line into dock; but had we 5 feet more water they would have been able to sail from the dock every tide this year. This greater depth of 5, 6, or 8 feet of water than we have at Liverpool is of great importance. The Huskisson Dock is 6½ feet below the Old Dock sill; that is our

Importance of deeper sills.

deepest sill. If we could get 12½ feet, it would give us great accommodation; of course if we could get it 2 feet more would be a greater accommodation; a sill of 16 or 17 feet would be of great importance if it could be carried out; but I have great doubts of it. The peculiarities of Mr. Rendel's plan in connexion with the low-water basin, as enabling him to get a very deep sill, have been explained to me. When I first saw this plan, five or six days ago, so many objections struck my own mind as to the possibility of its being carried out, that I could not look at it with any favour; in the first place, I did not see how they could keep that depth of water with the immense quantity of mud. The position and depth of Mr. Rendel's sill was first explained to me by Mr. Hartley; I had no acquaintance with the peculiarities of Mr. Rendel's sill, or the means by which he proposes to maintain it, except what I heard at the meeting. In the discussion which took place with Mr. Hartley, when the representatives of the trade were called in, I think I expressed a wish that we should have 2 feet more on the sill than Mr. Hartley proposed to give, if it could be done. On the occasion Mr. Hartley expressed some doubts as to his ability to give it; he said it was an experiment, but he thought if we were satisfied with the width of the gate he could give it to us. Mr. Hartley's plan, with those two long guts or locks, is very much the same thing we have at Liverpool. I should say, speaking generally, that this was reproducing at Birkenhead the same kind of accommodation we have at Liverpool, on a more extended scale. We get our coals from Cardiff, what is called the Aberdare coal—we get them by vessels. When first I heard of the railway to Birkenhead we were supplied by boats, by contract. I endeavoured to get them at a lower price, in consequence of the facilities I heard the railway was to give; but they told me they could not bring it as cheap by railway, even when it is completed, as it is brought by sailing vessels. The railway is not open yet.

F. A. Hamilton, 26 May, 1856.

Reproduction at Birkenhead of the Liverpool system.

James Aiken, examined by Mr. Merewether.

James Aiken, 26 May, 1856.

I am a merchant at Liverpool, and have been a member of the Dock Committee. My business has made me interested in the formation and use of docks. I have directed my attention to Mr. Hartley's plan and to Mr. Rendel's; I was invited to give my opinion upon that matter a short time ago by the town clerk. I gave the preference decidedly to Mr. Hartley's, because, in the first place, from my long experience and knowledge of Mr. Hartley, I have the most implicit confidence in anything that he projects, he having projected a great many docks during my career in the Dock Estate, and as a merchant in Liverpool; and, having invariably accomplished the object within the limits, it would be very rash indeed, I would hesitate very much, indeed, to doubt the propriety of any plan he might suggest; that is, from the great confidence I have in all he has done, and in his character. Mr. Hartley has realised our expectation of what he would carry out in the schemes he has proposed;

Confidence in Mr. Hartley.

James Aiken, 26 May, 1856.

looking at the extent of the works on the Liverpool side as they exist, I start with a strong partiality in his favour, and next, so far as my practical knowledge goes, I prefer his decidedly. I think this plan of Mr. Rendel's would be pregnant with danger; I think it would be extremely dangerous; I have no doubt at all it would silt up in spite of all the sluicing there could be, looking at the quantity of water and the velocity it would have in that basin; but, also, I would look with the greatest alarm indeed to the whole of that immense float depending upon that one pair of gates. A float penned back only by a pair of gates would be extremely dangerous. I think it must be self-evident to any one who has the smallest experience that there would be great danger in warping so great a distance; independently of silting up, here with a short hawser, you have much more safety and security. I am satisfied that the desire on the part of the Dock Trust is to give the greatest amount of accommodation they can in the port of Liverpool, whether on one side or the other; that disposition has always existed. I am quite convinced that the intention and desire on the part of the Trust has been to adopt the best plan for the general good of the port.

Mr. Rendel's plan dangerous.

Cross-examination.

Cross-examined by Mr. Calvert.

The Corporation never has managed the docks; the Corporation are only the Trustees, nominally the Trustees for the Docks. The dock management has always been under the Dock Committee. I think the Corporation the proper persons to manage the docks if it appoints a committee such as exists under the Dock Trust. I do not see why they could not select from the merchants of Liverpool a committee to manage the docks, as well as to manage anything else in the town. Some of those who are now members of the Committee of Works are appointed by the Corporation, and I do not see why they should not appoint a committee to manage on the one side of the river as well as on the other. I remember being examined in the year 1851. When the Corporation of Liverpool was a close corporation, we did all in our power to open it up. At that time we obtained, through the instrumentality of Mr. Huskisson, a portion of the management to be confided to the dock ratepayers. That is going back to a consideration of the difference between the two estates for a very long time. I draw a distinction between the Corporation under the old state of things, and the Corporation at present. I will state the reason: my belief is, that a community like Liverpool will always choose people who are capable of managing their great interests, and I would have greater confidence in their choice than I would in a self-elected body. I believe that the prevailing opinion at Liverpool is, in truth, that the value of property at Liverpool entirely depends upon the good management of the Dock Estate, and that everybody connected with the Dock Trustees must be impressed with that who had any sense at all. I do not think that there has been any change in the

Change in management of the docks.

opinion of Liverpool during the last few years; that it all depended upon the management of the Dock Estate. The proposal, before the purchase by the Liverpool Corporation of Birkenhead was completed, was to make docks both north and south at Liverpool. I believe the feeling is now, in fact, that for any surplus trade Birkenhead will afford better accommodation than going to the extreme north, or the extreme south. My wish is, that the surplus trade should be accommodated at Birkenhead. I believe that has been the feeling of Liverpool. I suggested the propriety of enclosing the great float some twenty years ago; and I believe Mr. Hartley's father made a plan showing how it might have been enclosed for the sum of 50,000*l.* or 60,000*l.*, and I dare say if it had been carried out it would have saved two millions. I really do not think it would make any difference to Liverpool except to a few interested, narrow-minded, prejudiced parties. The plan was never properly brought forward; it was made by Mr. Hartley merely to show what could be done; but at that time the trade of the Mersey had not reached anything like what it has been for the last twenty-six years. If the influential people of Liverpool had done wisely, in my view, they never would have sold Birkenhead; but the fact of it being sold I think shows there was no such feeling as to prevent any plan being carried out at Birkenhead. There has not been the greatest anxiety on the part of Liverpool to prevent Birkenhead harbour from rising into any importance during the last twenty years. I have had something of an opportunity of knowing Liverpool; and I know that you are alluding to a very small section of the community of Liverpool; it was not the general feeling at all in Liverpool, although it was the feeling of a few; there was a kind of fancy that it would be a rival port; but, on the other hand, if such a feeling did exist at that time, it no longer exists now, when the two are likely to become one. I do not think it ought to have been opposed by people of considerable influence; they were not men of wealth and influence; they were not very conspicuous. Those who did their best to carry out whatever was at variance with the interests of Birkenhead were very few and insignificant as far as I can recollect. I understand you to allude to a section of people at Liverpool who opposed the extension of the docks at Birkenhead. You asked me if they were influential and wealthy. I do not think they were distinguished for either. I object to Mr. Rendel's plan, on the score of there being a single pair of gates; that is one reason, and one which is very much in my mind. If two pairs of gates instead of one were substituted, you are getting to Mr. Hartley's plan, because, if you have another pair of gates brought down here, you would then have an inferior half-tide basin. If you put two pairs of gates where there is one, that would remove the feeling of danger, but it would not make that plan to compare with this, in my opinion. I think it would silt up. I have not examined that subject very accurately, but, having been a merchant at Liverpool for fifty years, my eyes have been opened to silting up in other places. I am

James Aiken, 26 May, 1856.

Preference of Birkenhead for surplus trade.

Opposition to Birkenhead.

Danger of one pair of gates.

James Aiken, 26 May, 1856.

of opinion that it is of very great importance to obtain the utmost depth of sill at Birkenhead, consistently with safety. I have no idea of how many feet may be obtained on one side or the other. I must again acknowledge to the Committee that my opinion upon that subject would be very much guided by Mr. Hartley. I asked the question: "Mr. Hartley, could not you give a greater depth of sill with safety?" and he said, "Certainly not." That opinion would completely guide me as a practical man in saying, I will not set myself against a man with such practical knowledge as he has. He told me that his depth was as deep as he could with safety go to.

C. Turner, 26 May, 1856.

Charles Turner, examined by Mr. Merewether.

I have been Chairman of the Liverpool Dock Committee since August, 1851, and a member of that Committee for about a year before. As a member and chairman of that Committee, it has been my business to devote great attention to the dock question. Last session the Dock Committee came to Parliament for an extension of docks, proposing to take power to raise about three millions and a half of money. Parliament has always given to the Dock Committee a considerable discretion as to the application of money, and also as to the carrying out of any plans which were prescribed by Act of Parliament. There are certain works for which we have already taken Parliamentary sanction; but there has always been a discretion given to the Dock Committee to vary those works, and to carry them out either in a larger or in a shorter time, as the trade of the port required. Our purpose last session was agreeable to that which had been the course adopted in previous years; and for the three and a half millions which we proposed to go for last year we did not intend to take—in fact we should have refused to take—compulsory powers as to the spending of any specific sum of money, if in our opinion with regard to the experience of the trade of the port it did not require it; the money was to be spent from time to time, and we contemplated that probably if the trade of the port increased in the way it had done for a great many years previously, in the course of nine or ten years the whole of that sum of money would require to be expended; but the object of going for so large a sum of money at that period was to prevent the necessity of going to Parliament from time to time, to provide for the necessary trade of the port, so that we might be able, as the trade of the port increased, to accommodate that increased trade to the best of our judgment. The Committee of last year determined that the amount of money we were to expend at Liverpool should be limited to about between 600,000*l.* and 800,000*l.* They determined that the Corporation should purchase Birkenhead; the Dock Trustees declined to purchase Birkenhead; so the Bill passed last year, binding the Corporation among other things, and ourselves, to come to Parliament, either separately or in conjunction with each other, for the purpose of carrying out the Act of Parliament of last year. That Act came into operation on the 8th

Bill of last Session.

Discretion as to works.

of August. The Act of Parliament having come into operation—in fact previously to its coming into operation, for it received the royal assent on the 23rd of July, I think, or the beginning of August—there was a meeting of the Town Council at Liverpool, and a meeting of the Birkenhead Committee, which was appointed specially to look after this matter. They presented a report to the Council, detailing the obligations which had been imposed upon the Council by this Act of Parliament, and a Committee was named specially to carry out the purposes of the Act. That Committee requested that a deputation from the Dock Committee should be added to them, and Mr. Shand, the Deputy Chairman, Mr. Rankin, and myself, were added to that Committee. On the 6th of August, the special Committee requested that the dock surveyor might be allowed to prepare plans for the purpose of carrying out this Act. On the 16th of August last that application was authorised, and Mr. John Hartley was instructed to lay out plans on the subject. On the 8th of October, Mr. Hartley submitted his plans to the special Committee, and having been considered by that Committee, they were referred to the Dock Committee for their opinion upon them on the 11th of October. They were brought before the Dock Committee, and by them referred to the Sub-Committee of Works, which has the special supervision over these matters; and Mr. Brocklebank, as being a very large shipowner, and Mr. Mann, were both added to the Committee of Works, from the general body of the Dock Committee, to carry this object into effect, forming a most efficient Committee. Mr. Mann at that time was chairman of the Shipowners' Association. On the 16th of October, that Sub-Committee held a special meeting, and at that meeting Mr. Hamilton, Mr. Mac Ivor, and Mr. Laird, were invited to attend, for the purpose of consultation upon Mr. Hartley's plans, to see how far, in their opinion, those plans would meet the wants of the trade. I am a member of the Council as well as of the Dock Committee, and I believe, indeed I am quite sure, that on the part of the Dock Committee and on the part of the Council, they had only one object in view, namely, to make the Birkenhead Docks the most useful they could to the trade of the Mersey in every respect. There is no influence that any party had in any property, and I do not believe that anybody is influened by the consideration of property in any shape or way. I have no other interest than making the docks the most efficient to the trade of the port that is possible. Liverpool has expended its funds to the amount of 1,200,000*l.*; it can have no other object, in fact, than an anxious desire to lay out that money to its own best advantage and for the interest of the trade of the Mersey generally. Having spent 1,200,000*l.*, they must get interest back for their money; at the same time, the docks in their present state do not pay for the management, and unless they carry them out and make them efficient for the trade, they never can expect a return for their money. I have no doubt at all that if Mr. Rendel's scheme were to be carried out—and

C. Turner, 26 May, 1856.

Sub-Committee of works on plans.

No interest but for the best plan.

C. Turner, 26 May, 1856.

it is the opinion of a great many practical men, I can name several who have expressed opinions to that effect—that it would fail; and if it did fail, a great part of the money so laid out would be actually lost. I am not surprised that, having to incur an expenditure of 1,200,000*l.*, they should give the preference to that which appears to be the safer scheme; if the property was my own, from the opinions I have heard from a number of professional people and men of a great deal of mercantile experience, certainly I would not myself adopt the plan of Mr. Rendel. I should be afraid of losing a great deal of my money if I did. If it was my own, I would not adopt it for that reason, and I suppose others do the same thing. From my present knowledge of the parties of the Corporation, I can give a most unqualified opinion to the Committee as to the motives which have influenced those who have made the preference upon this matter.

Cross-examination.

Cross-examined by Mr. Calvert.

I cannot say whether I was examined upon the subject of the Liverpool Bill last year, but I think it is likely, as Chairman of the Dock Committee, that I was examined in support of the Dock Committee's Bill. The plan of the last year was not founded upon the notion that the Birkenhead plan would fail altogether; it was founded upon this, that whatever became of Birkenhead, it was probable that an extension of docks would be required on the Liverpool side. The Dock Committee have been frequently blamed for being too slow, that instead of going ahead they require to be forced, that they had been backward. It was thought by the great bulk of the merchants of the town, and by the great majority of the people interested in the trade, that it was desirable that the Dock Committee should be provided with money for a number of years for carrying out such works as might be required on the Liverpool side. There was no intention whatever of stopping the works on the Birkenhead side, or of doing anything more than this, namely, making such works as the trade of the port required in that locality. I mean to say that our plan of last year was not intended to accommodate the entire trade of the Mersey, if you mean in opposition to Birkenhead; the object was, as I have stated, that they believed that these works would be required upon the Liverpool side, whatever became of Birkenhead, and if they were so required, it was the intention of the Dock Committee to ask Parliament to give them the money for those purposes, and if they were not required, the Dock Committee would not have spent the money. I mean to say this, that if Parliament had said to the Dock Committee you shall have the money, but it shall be compulsory upon you to spend it upon the Liverpool side, and upon particular works, the Dock Committee would have refused it, because in a matter in which our income was so uncertain, being an income derived from trade only, we are careful not to engage in certain obligations with an uncertain income, except we are certain of those works

Objects of plan of last Session.

producing a return for the money which we lay out. We have no shareholders behind us, like a railway. My opinion is now, and was at the time, that the object was to provide such works as would be required on the Liverpool side of the water. Well, now then comes this question —many people believe that the trade would not go over to the other side at all: my opinion is, as I expressed it last year, or, at any rate, it was my opinion, that if the Birkenhead Docks remained a separate concern, I did not believe that any large bulk of trade would ever go to the other side; and the Committee, I believe, came to the same opinion last year, that it is only by being worked in connexion with the Liverpool Docks that they can expect any large quantity of trade to go from one side of the river to the other. The opinion I expressed is this, that we only intended the money for the purpose of being laid out in such portions, at such times, and in such places as the trade of Liverpool required; and that if, in our opinion, the trade went to the other side, and docks were not required upon the Liverpool side, we would not then spend the money; we would not have made the docks, or have spent one farthing which we did not believe was absolutely required in the works upon which we proposed to spend the money. If parties required the docks to be made there, the Dock Committee at Liverpool would have made them. The Liverpool Corporation are prepared to make Birkenhead as successful a port as possible. I believe they will spare no money or expense to make it as useful as possible; and the only reason we prefer Mr. Hartley's to Mr. Rendel's plan is, that we think the one would have the effect, and that the other would not. I believe they will make the dock as efficient as they can; and it is with that object that they had employed a man who has had more experience in the Mersey than any other man in Liverpool, and that is Mr. Hartley, the dock engineer. No man knows half as much about the Mersey, or has had so much connexion with it as himself. In the first instance, the object is to provide such an entrance into the great float as to make the great float available to provide the best accommodation afterwards for whatever traffic will go there. But nobody can say, in the first instance, what that will be; and it would be ridiculous to spend a large sum of money to provide for that traffic whether it will go there or not. The first object is to make the entrance into the great float efficient; and if we found after that, for instance, that the timber trade desired to go there, we should provide accommodation for the timber trade, and the same with any other trade; but the first matter is to make the water in the float efficient, and the entrance into it as efficient as possible. The question before the Committee is, how we are to make the best entrance to the float, and the best preparation for docks; to see how we can best carry out the object of the Committee of last session, which was to make the Birkenhead Docks the most efficient for the trade of the Mersey, in connexion with the port of Liverpool. That is the object embodied in the Bill, there can be no doubt whatever of that.

C. Turner, 26 May, 1856.

Trade would not go to Birkenhead except as in connexion with Liverpool.

Uncertain what traffic will go there.

The best entrance.

C. Turner, 26 May, 1856.

By the Committee.—Our year ends on the 24th of June of each year, therefore last year will be the year ending the 24th of June, 1855. We shall have another year, of course, on the 24th of June next, which is next month. The gross income for the year ending the 24th of June, 1854, was 385,312*l.*; I throw out shillings and pence. The surplus, after paying interest upon bond debt and expenses of working, was 69,090*l.* Our bond debt is between 5,000,000*l.* and 6,000,000*l.* Paying interest and all expenses, that is the net surplus. The income for the year ending 24th of June, 1855, was 358,111*l.* The surplus of that year was 16,792*l.* There was a considerable falling off in trade, as you are aware, during that year. Then the interest of money was considerably raised, in consequence of the war. Of course, upon a sum like 5,000,000*l*, one per cent. is 50,000*l.* a year at once. We proposed to have raised three millions and a half; of course, if we had raised that, we should have raised it upon the credit of the dock dues, but we should only have raised it at such times and in such proportions as we thought we had surplus to pay for. I do not think we should have raised more than 250,000*l.* or 300,000*l.* in the first year and a half; we cannot well spend more than about 250,000*l.* in a year upon works. We have no other source from which to pay interest upon money raised than our dock dues; in fact, we should be particularly careful not to involve ourselves in difficulties, because if we were to do so, we must raise the rates; and if our income this year, which promises now well, had remained at the same rate as the income of last year, we should, I think, have had barely money enough to pay our interest and expenses, because the interest on money had increased so much; we purchased about 250,000*l.* worth of land which the Bill of last year gave us power to purchase; that is 12,000*l.* a year, and with the increase of interest, I doubt whether we should have had funds enough, if things had remained as they were. If the Committee of last year had decided that it should only have been the Trustees of the Docks that should have purchased the Birkenhead property, we should have declined it most certainly; we never proposed to purchase it at all. We could not have raised the money for it; with a surplus of 16,000*l.*, we could not accept bills to the amount of 1,200,000*l.*, and that 1,200,000*l.* involving a further expenditure to make it available of from 500,000*l.* to 800,000*l.*, which the Corporation proposed to spend in addition, and that with the uncertainty of our having funds for it. One ground upon which the Trustees refused was, that they would not have entered upon that liability with their present rate, or the anticipated rate of surplus revenue; and the other was this: the Dock Committee would have refused to take the Birkenhead property with any obligation as to particular plans to be carried out; they would never have taken the docks with the obligation of carrying out Mr. Rendel's plan, or any other plan as a positive obligation; we have always had a power of discretion entrusted to us. There is no private interest in the matter; we are a public body,

Income of Liverpool Dock Estate.

Purchase of Birkenhead declined by Dock Trustees.

associated together for public purposes, and Parliament has always had confidence in the Dock Committee, that they would carry out the plan in the best way the trade may require from time to time. What we think good this year from change of trade, we may find not suited a year or two hence; and it has been permitted to us to vary the plans as we have found necessary, and therefore we have always had power to vary the plans, and I am myself certain that the Dock Committee would have refused to take those plans with the obligations which the Corporation assumed. The Birkenhead Docks are only finished to a small extent. So far as they are finished, the Act of last year requires them to be put under the management of the Dock Committee; and the whole, when it is finished, will be put under the management of the Dock Committee. We are bound as to the 800,000*l.* by the Act of last year; as to the application of the money which was given last year, it is all allocated, therefore we have no power of going on beyond a limited extent. That 800,000*l.* was devoted to several purposes, all of them specified in the Act. One purpose is for making a lock to the north of the Huskisson Dock. The Huskisson Dock is the most northerly dock; it has no entrance at the north end, and we are making a lock there of 100 feet wide and 500 feet deep within the chamber. There is a dock basin, which the Committee of last year gave us power to make. That was in progress of completion—it was for the purpose of completing it; then we are deepening the Queen's Dock, for which purpose part of the money was devoted; then it gave us power to take 250,000*l.* worth of land, which we thought it desirable we should get; it was all absorbed in a variety of things; there was 30,000*l.* for completing the river wall. When the Birkenhead Docks are finished in the manner most approved, I think the probability is that they will be of essential importance to the trade of the Mersey. It is a matter of very great doubt and difficulty in all cases where trade has to be conveyed from one locality to another, however much one may have peculiar advantages over the other; it is always difficult to say what course trade will take in such a case; it is very difficult to say whether the trade will go to the south side, but we are certainly desirous, and are doing all we can to make the docks at Birkenhead efficient. We cannot say that we shall get a very great deal of trade there, but we will do all we can for it. I think we should not have gone on with the northern scheme, except the wants of the trade were more fully developed than they were at the time; we should not go on with the northern scheme any further than the Act of last session allows us to do. It is difficult to say whether the completion of a system of dock accommodation at Birkenhead, or the further extension of docks on the Liverpool side, would be the more convenient for the trade of the Mersey, because I should not do either of them as a dock question, without the trade at the time was likely to pay for it first. My opinion is, that if docks were made at the north, as it was proposed by the Bill of last year, those docks would be occupied before the parties

C. Turner, 26 May, 1856.

Discretion as to varying the plans.

Objects of Act of last session.

Doubts as to transference of trade.

C. Turner, 26 May, 1856.

would go to docks on the Birkenhead side; that is my impression, from what I have been told by the timber trade, and other trades. What we proposed to do at the north end was for the expected accommodation of the timber trade; I consulted a great many merchants in the timber trade, and they stated that they would prefer remaining at the south for that class of accommodation, to moving to the north, but they would prefer going to the north to going over to Birkenhead. If you asked me what I should do, I should say I would endeavour to get as cheap an entrance to the float as possible, and then to make the best accommodation with regard to the branches of trade which would come over. We should never have undertaken these docks, if we were to look to Mr. Rendel's plan being carried out. The gentlemen who acted on the part of the Council did not expect this opposition; but if you ask me individually, I certainly did expect that Mr. Rendel would fight his plan very strongly. It was perfectly understood last year, and I believe the gentlemen forming the Committee of last session will tell you that those plans of Mr. Rendel's were to be altered. If you ask the members of that Committee — I do not see any of them here — I believe they will tell you that it was perfectly understood that it was never intended that those works of Mr. Rendel's should be carried out. That was publicly expressed on the part of the Dock Committee. Mr. Hope Scott stated distinctly that the Dock Committee would not be bound by Mr. Rendel's plan. I heard something equivalent to that. I am telling you the substance of it; we talked of it out of the Committee, and that is the substance of it. I doubt very much whether the Birkenhead Dock system when completed will leave a considerable surplus revenue; I have no doubt whatever that it will be a great many years before the Birkenhead Dock system will pay the interest of the money which the Corporation will expend for it. The expenses themselves will leave a considerable surplus, but you must add to the expenses the interest of the money. You are all aware that it will cost the Corporation 2,000,000*l.* to carry them out. I am satisfied it will be a great many years before they will get the interest of that money.

North shore preferred to Birkenhead.

Dock Committee not bound by Mr. Rendel's plan.

Mr. Merewether stated that that was the case on behalf of the promoters of the Bill.

SIR WILLIAM CLAY, BART., IN THE CHAIR.

Tuesday, 27th May, 1856.

Case of opponents.

The Committee having considered the course to be taken by the respective counsel on behalf of the Lancashire and Cheshire Junction and the Great Western Railways, the Chairman stated that the Committee had come to the following resolution: "The Committee will hear only one counsel against the preamble, on the merits generally, who will state the case against the preamble common to both the opposing parties who appear before the Committee (applying that principle also to the witnesses to be called in support of that statement), the counsel so stating the general case being at liberty to state on behalf of his clients any peculiar ground of opposition. If, after the case thus conducted be concluded, there should appear to be any grounds peculiar to the other opponents to the Bill, the Committee will be willing to hear them thereon." He desired to add to that decision of the Committee, that it must be perfectly understood that the second counsel would be confined strictly to any grounds peculiar to his own clients, and which had not been stated, or which could not have been stated in the general opposition. The parties having consulted, determined to proceed by calling their witnesses first.

Course of proceeding.

James Meadows Rendel, examined by Mr. Webster.

J. M. Rendel, 27 May, 1856.

I am a civil engineer, and have been for many years very extensively engaged upon public works, particularly upon harbour works. At this moment I am engaged upon the Portland and upon the Holyhead harbours at Guernsey, and at Leith; in the Thames as engineer of the London Dock Company, and have carried out the new works of the East and West India Dock Company; I was the engineer for the Grimsby Docks; I am also the engineer for the Prussian Government and the Elbe navigation, and have designed docks at Genoa. I have had very considerable experience at home and abroad for many years. My attention has been directed to the Mersey since 1843; it had not been particularly directed to the Mersey before 1843, when I was engaged by some local parties to inspect Wallasey Pool, with a view to the construction of docks in that pool. Those parties referred a design to me that had been prepared by a local gentleman some few years before. Previous to making up my mind upon that design, I thought it necessary to examine Wallasey Pool and the Mersey as a whole, and to have a considerable number of borings made in various parts of it, and also an exact survey. The peculiarity of the design which had been prepared, and which was submitted to me by the local parties, was, that it proposed two small basins, entering from the river. (*See* Laird's plan of 1837 on sheet of "Plans of Docks in Wallasey Pool.") There were two

Plan of local parties in 1843.

M. J. Rendel. 27 May, 1856.

basins—the one for outgoing vessels, and the other for incoming vessels. Then there was a half-tide basin, much of this kind, and locks into the float, and there was a side dock across the south reserve, in this way. I thought it necessary to examine into the whole question of Wallasey Pool, which struck me as a place peculiarly fitted for docks of a particular description in regard to the wants of the Mersey. Having examined Wallasey Pool, I rejected the design submitted to me on the following grounds:—First, I considered deep sills absolutely necessary to meet the wants of the trade of the Mersey; I therefore felt that, in order to obtain deep sills and make them useful, it would be requisite that there should be a very large basin, from which vessels might enter the dock over those deep sills; the stream of the Mersey making such an arrangement necessary, unless you carried out, as at Liverpool, numerous entrances. That was the reason why I proposed a different form of plan from that which was submitted to me by local parties, and which I thought not to be adapted to the wants of the Mersey. It was designed upon the Liverpool plan; that is, having the sills laid about the level of 6 to 8 feet, I forget which, under the Old Dock sill; and it occurred to me that unless the parties were prepared to make numerous entrances as at Liverpool, such a plan was not suited to the wants of the float. One of the first things upon which I made up my mind as essential to the wants of the Mersey was a deep sill. The deepest sill, I think, at that time in the Mersey, was 6 feet below the Old Dock sill; and the universal complaint was, that vessels of the then tonnage were often neaped in the river as many as eight or ten days. In consequence of the opinion then expressed, that particular plan was given up by me, and I presume by the parties who applied to me, because they adopted the plan I recommended, and came to Parliament for it. The plan originally proposed and submitted to me was a plan devised with a view to the formation of a joint-stock company; and I recommended the parties that the works proposed should be carried out by a public trust. With respect to the plan recommended by me, I believe I cannot do better than take the description from those plans; I have not examined them, but this is the plan, I believe; that first plan was for making the great low-water basin subsidiary not only to the docks in the float, but also to the three docks which you see along there parallel with the float; that was the plan. Then all the small craft traffic was intended to be carried on through a canal on the south side of those docks, entered from the small basin at Woodside, which we have heard of already in the Committee. The plan, which is No. 1—(*See* plan marked, Rendel, October, 1843, on sheet of "Plans of Docks in Wallasey Pool")—on the wall, was not the plan for which they came to Parliament. The formation of a company was abandoned, and the plan No. 2—(*See* on same sheet)—was the plan, or at least that was the plan that passed Parliament in 1844. That was not exactly the plan for which we came to Parliament; it was modified; the opposition we had rendered it necessary to modify it in several particulars, but not in principle, only

Grounds of rejection of plan.

Public trust proposed instead of a company.

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in detail. I thought it necessary and expedient that the works to be carried out should be carried out as a public trust. The plan upon which I recommended the coming to Parliament in 1843, was accompanied by a report dated the 25th of October, 1843. In that report, I pointed to the advantages of Wallasey Pool for the extension of the shipping accommodation in the port of Liverpool, not in the shape of rivalry to the docks there, but as affording the greatest conveniences that could be possibly afforded. I thought Wallasey Pool had very great natural advantages, and I fancied that it was ridiculous to talk of any rivalry to Liverpool. I considered it was the business of parties who came to Parliament to come with the best plan, without reference to any question of rivalry with Liverpool, and I studied to design what I thought best with reference to the trade. The first paragraph of my report had reference to, and I then from the state of the Mersey was enabled to anticipate, the kind of accommodation that recent years have shown to be required. It was very manifest, from the returns of shipping to the Liverpool Docks, that the tonnage of vessels was increasing, and that their build was becoming sharper; that they would require deeper sills, and that all those evils which then existed at Liverpool from the want of deep sills would yearly increase. Everything from that time to the present has confirmed the opinion as to the wants of that port in that respect. I stated in the report that the area of Wallasey Pool is about 340 acres; that was the area of Wallasey Pool up to a medium tide line, which is 15 feet 6 upon the Old Dock sill. The great float is 150 acres; the pool was 340 acres at high water of ordinary tides, the ordinary tides having been determined, with a view to the settlement of the claim of the Crown, to be 15 feet 6 inches upon the Old Dock sill; that is the average of all the tides observed —not predicted—but observed for seven years; all tides, springs and neaps together. The mean of high water of all tides in the year is 15 feet 6 above the datum. The calculations have reference to seven years. That area of 340 acres relates to the boundary line of the mean of all tides; a high spring tide, which rises 22 feet, will cover very nearly 400 acres. According to the claims as usually adjusted by the Crown, the Crown claimed the highest spring tides; in this case the question was settled at the average of all the tides. The first year I was connected with Birkenhead, I recommended the Woods and Forests to have that point settled, and they settled it in the way I have described. At the commencement of these proceedings, there were questions with the Crown as to what should be done with these 340 acres; there were references to Sir William Cubitt and Mr. Hartley; their reports have been laid before Parliament in a Parliamentary paper; Sir William Cubitt, for the purposes for which the parties were then applying to Parliament, namely, of a Dock Trust, recommended the Woods and Forests to accept as a full equivalent 7800*l.*; that was in 1844; the plan which we came to Parliament for was the one referred to in my report, that low-water basin, a small dock at Bridgend, and a free basin at

Plan brought into Parliament.

Requirements of the trade.

Boundary of Crown rights.

Valuation of Crown rights.

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Woodside; the same as is shown upon the plan No. 2, in every essential particular; but as I said before, the opposition which the original plan referred to in this report had in Parliament, induced some trifling alterations in the details, but not in the principles. The Committee may receive that upon every point of principle as the plan. The Woods and Forests were dissatisfied with the valuation of Sir William Cubitt, because it had been reported to them that similar land was being purchased by the Dock Trustees of Liverpool at some fabulous prices; and therefore the Woods and Forests felt it necessary to refer the question of the value of that property to Mr. Hartley; Mr. Hartley's valuation was 800,000*l.*, I think; all the papers are before Parliament. The promoters of the measure were about to abandon it in that state of the land question. We were in Committee before the question about the land was settled, and the present Duke of Newcastle, who was then the First Commissioner of Woods, very kindly settled it in this way, which I will describe, because it is rather material to the case. I do not exactly remember what the estimate of the works was, whether 300,000*l.*, but 800,000*l.* was the total for the land and for the works to be made, and by which the trustees were to acquire the site for their works. We were in Committee, as I said before, before that question was settled, and it was absolutely necessary it should be settled, and the Duke of Newcastle agreed that the Crown should do this: my memory is very good about it; I can state it without the report; the Commissioners of Woods gave us in the first place 12 acres immediately within the works shown by that plan by the word "float." They gave us the whole 37 acres, the size of the low-water basin; they gave us, I think, 4 acres for the dam; they gave us the site of the small dock, the Egerton Dock; they gave us for the public a margin of 200 feet in width on either side of the low-water basin, and, I think, 150 feet in width for a promenade or esplanade, as it was termed in the Act, along the whole line of the river, that esplanade being a question raised by the opponents of the Bill, on the ground that the public had a similar esplanade opposite the Prince's Dock. I think they gave us altogether 100 acres out of the 340, on condition that we should form an esplanade, and that we should construct the works according to the plans which we came to Parliament for. The Woodside Basin as originally designed—that is one of the alterations—was a 6-acre basin; it was increased to 16 acres at a very great cost; it was stated that, notwithstanding the low-water basin would be some equivalent for the loss of Wallasey Pool to the general coasting trade, yet inasmuch as there would be a small toll upon it, it would not fairly represent, so far as the public interests were concerned, the convenience of Wallasey Pool; and therefore Parliament, at the instance of the opposition, bound us to increase the size of the Woodside Basin from 6 acres to 16, and imposed upon us a clause that in the event of that not being sufficient, we should make additional accommodation at the north end of the works. I understood that these

Reference to Mr. Hartley.

First grant of land by the Crown.

Woodside Basin enlarged for the coasting trade.

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public quays were reserved at the instance of the opposition on the ground of having similar quays at Liverpool; the quay of Prince's Dock, I think, was quoted; in addition to the quays and esplanade, landing-steps in the wall were also imposed; and the Woodside pier was to be raised to afford protection to the basin; this Woodside pier slip, before we began our work, was submerged at high water; it was urged that such was the exposure of this shore, that it would be necessary we should raise this pier, and make it a high-water pier to shelter the vessels using this as a free basin; that was also imposed upon us; and so stringently were we tied, that we were not allowed to begin the other works until the works at the Woodside Basin, including the building of this pier, were finished. According to the original arrangement with the Crown, that Woodside Basin was to be a free basin; by the works imposed upon us by the opposition, it was increased from 6 to 16 acres, and we were to raise the pier to afford shelter; in fact, it was made a very expensive work. The precise extent of the land the Crown gave was 99 acres; the value of that land, according to Mr. Hartley's valuation, would have been 240,000*l.*, if they had taken the whole as 800,000*l.* The Crown reserved to itself about 65 acres, the two reserves; that was under the Act of 1844. Under the Act of 1845, there were 150 acres of the float given up by the Crown to the trustees, and consequently the Crown reserved for itself only about 100 acres. The area of Wallasey Pool in its then state, above the line of the great dam, was 170 acres at a 15 feet 6 inches tide; Wallasey Pool was dry at low water, excepting a channel through it.

Works imposed on promoters.

Opposition of Liverpool.

The Liverpool Corporation, or the Liverpool Dock Trust, was always understood to be the principal opponent to the Bill; in fact, they appeared by petition, and kept us, I think, some thirty or forty days in Committee. The grounds of opposition were, first, that we excluded the public from the use of Wallasey Pool; that it was necessary for a large class of vessels to ground upon, particularly in bad weather; and a case was made out that a great number of vessels had used to ground there. The question, and the most formidable question, raised by the Corporation and the Dock Trustees against the plan was the loss of back-water. It was contended that the sea channels of the Mersey were so difficult to be maintained, owing to the quantity of sand-banks, that any loss of back-water would be fatal to those channels; and that is the principle upon which they had for years opposed the encroachment upon the tidal back-water. Mr. Bramley Moore's letter to the Admiralty is a very full explanation of the opposition: he was then Chairman of the Dock Trust. The assertion was, that Wallasey Pool being filled at high water, assisted in keeping the channels of the Mersey clear by the refluent stream; that it formed an essential part of the whole tidal estuary into what was called the neck of the bottle; and could not be given up without the most serious consequences to the sea channels. They considered of peculiar value the discharge of the whole contents of Wal-

Injury to the sea channels.

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lasey Pool at high spring tides. It was contended by all the witnesses, including Sir William Cubitt and many mathematicians, that the quantity of water passing off by the sluices at low water would be an equivalent for the quantity reserved below the 13 feet, so that there would be no actual loss in power, although there would be in quantity. That though you diminished the quantity discharged at every tide, the water would pass off at a time of tide more effective in removing any obstructions in the sea channel. The coasting trade, before anything was done at Birkenhead, used Wallasey Pool for berthing—it was a place for vessels to ground upon, owing to the exposure of the Mersey. Small vessels not well built were frequently in danger, and therefore, in bad weather, they used to run upon this part of Wallasey Pool, which was a sort of public quay at half-tide about here. The whole within Seacombe Point and Woodside Point here formed a part of Wallasey Pool. There was very little trade in Wallasey Pool; there was some trade, but it was much resorted to by vessels for refuge, that is, to run on the banks, instead of having to ride out in the Mersey in the storm. This will give you the most complete idea of what Wallasey Pool was. (*See* "Plan of Wallasey Pool, 1843.") It was contended, on behalf of the promoters of the plan, that, although you took away part of the ground covered at high water, yet that the sluices, by the water being discharged in a low state of the tide, would be equal in effect to the water retained; that it was a compensation for taking away that water, or a portion of it. The case of the promoters was this, that it could do no injury to the Mersey, first, because by building a wall from Seacombe to Woodside more water would pass into the upper reaches of the river; next, that the loss of the portion of the water contained in Wallasey Pool could be more than compensated for by the portion run off through the sluices, that being run off near the time of low water, when it would be the most effective on the sea channels. The grounds of the opposition of the Corporation were twofold; the letter of Mr. Bramley Moore, (*b*) who was then Chairman of the Dock Committee, was to this effect: "That the Trustees of the Liverpool Docks have opposed this Bill in Parliament on public considerations only, and they desire to represent to your Lordships that they do not oppose the construction of docks and other works at Wallasey Pool, provided they are so planned as not to injure or endanger the navigation of the port." That was the substance of the opposition. The letter also stated "That the Dock Trustees are informed that it has been stated to your Lordships, as well as to the Lords of the Admiralty, that, although the construction of the proposed works and the reclaiming of land at Wallasey Pool may diminish the quantity of water now flowing into the Mersey, yet that the water so abstracted may be compensated for by reserving a certain quantity, and

Use of Wallasey Pool by coasters.

Case of promoters as to loss of water.

(*b*) *See* letter of Mr. Bramley Moore, and a report of the acting Conservator of the Mersey thereon, in evidence of Captain Evans on Birkenhead Docks Bill before Committee of the House of Commons, June 9, 1852, Webster's Report, pp. 397-403.

discharging that quantity at a later period of the tide, when it is said it will be more effectual for the scouring and preservation of the sea channels." Those two paragraphs briefly express the case of the opposition upon the conservancy question that was raised in 1844, and which took us something like twenty days. That case of the opposition was supported, upon the part of the Corporation, by Mr. Rennie, Mr. Walker, and Mr. Vignolles. Most of the leading engineers in the country were called upon one side or the other; everybody, I believe, who knew anything about it. This chart will explain at once the case of the Liverpool opposition. (*See* "Chart of the Mersey.") You see the Liverpool chart, with the sea entrance to the Mersey. Those are large sand-banks, many of them dry at half-tide—dry gradually down to low water. It was contended that, owing to the great extent of those banks, the prevalence of westerly winds, and the quantity of sand taken up by reason of the westerly winds, and brought from those banks into the channel, any loss of back-water would be fatal to those channels. Mr. Bramley Moore's letter contains this further paragraph: "That the Dock Trustees have taken every means in their power to test the correctness of this last supposition, and they beg most seriously to assure your Lordships that, after the most careful consideration of it by many experienced engineers, they are convinced that the mode by which it is proposed to compensate for the water abstracted will be altogether unavailing, and that, whatever diminution takes place in the tidal waters of the Mersey, by reason of the proposed works, will be an absolute and entire abstraction of so much water from the scour of the sea channels, without any compensation whatever." The opinions expressed in those three paragraphs of Mr. Bramley Moore's letter were supported by the evidence of Mr. Rennie, amongst others. I heard the questions put to Mr. Rennie, when he was examined here the other day. I presume those questions, as to the abstraction of back-water, which were read to him as put in 1844, had reference to those three grounds which were stated by Mr. Bramley Moore as a summary of the case. Sir William Cubitt was examined upon that occasion by the promoters of the bill; and he gave the most conclusive evidence from all his experience that the quantity of water to be returned by the sluices at about the time of low water would be more than an equivalent for any quantity which was detained, by reason of the permanent level being fixed at 13 feet. The abstraction of this water of Wallasey Pool was one main ground of the opposition of the Corporation; it had, and it deserved to have, the greatest weight with the Committee. It was my view, then, that the return of the water at the later period of the tide would be equivalent in its operation over the sea channels for the water so running off from Wallasey Pool; and it was part of the original plan, as you will see by the report you have referred to, that it should be so regarded. That opinion was supported by Sir William Cubitt, and all the engineers who were called in support of the Bill in 1844; it was, in fact, the fight of the case; and it deserved to be so—it was a very important question, and it ought to be

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Abstraction of back water.

Water from sluices an equivalent.

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treated so. It was referred to in the original report of 1844 in the following paragraph: "As regards the loss of back-water which the Mersey will sustain in carrying out the design now proposed, it is to be observed that a mere comparison of the quantities of cubic feet of water at any given tide, passing into and out of Wallasey Pool in its present and its embanked state, would be a very superficial view of the question. At present, the back-water passes off at a time of tide when it can have but little, if any, good effect or scouring influence; when retained till low water, though the quantity discharged will be less than at present, the power gained will be vast in excess, and will be permanently secured, for, in reference to this point, I must repeat a remark already made, that the capacity of the pool for back-water is yearly diminishing, and if left in its present neglected state will, at no distant period, be entirely lost." That paragraph expresses the substance of the case that was made before the Committee in support of my plan, and in opposition to it as regards the sea channels. The other ground of opposition was the obstruction of the accommodation for coasting vessels that used to beach upon the banks in Wallasey Pool. In consequence of this opposition the basin was increased from 6 to 16 acres, and made a sheltered basin in the way I have described. The winds that would render that basin unsafe were south and south-east.

Accommodation for coasting vessels.

Reduction of dues at Liverpool.

The dock rates at Liverpool have been subject to reduction from time to time; there was a reduction in 1844, when the plans were before Parliament. The works of 1844 related mainly to the low-water basin and its entrances, and the Woodside Basin; and the grant of the Crown related also to the same.

Upper pool under first Act.

The upper pool, under the Act of 1844, if nothing else had been done, would have been left unwalled and undeepened, except the 12 acres before referred to, given to us by the Commissioners of Woods, under the Act of 1844. The following paragraphs in my report of October, 1843—"At the head of the basin, and as shown on the design, viz., extending across the pool from the patent slip-yard, on the Birkenhead shore, to the Smalt Works on the Seacombe shore, it is proposed to build a masonry dam for the object of retaining in the pool above a sufficient quantity of water to form it into the floating dock." "Three communications are proposed between this float and the great basin, viz., a pair of gates 70 feet opening, one lock of 50 feet, and one of 30 feet, and the sills of each entrance to be not less than 6 feet below the Liverpool Dock datum"—describe the original scheme as proposed in 1843. Those dimensions have all been greatly increased; the experience of the wants of the trade showed that, large as was the accommodation then originally suggested, it would not be sufficient for the purpose. The Act of 1844 constituted the Birkenhead Local Commissioners the Trustees for those docks, and they came to Parliament in 1844-45 for power to deepen and wall the great float. During the inquiry upon the Bill of 1844 the intention to complete the works in this respect was stated. Among other grounds of objection to the plan of 1844, it was stated that it left the upper pool

in an unimproved state. The parties promoting the Bill then came under a sort of engagement to complete the works of the upper pool by coming to Parliament in the ensuing session; not a Parliamentary engagement, but an engagement with the landowners or some of the parties. The Crown gave further assistance for obtaining the Act of 1845, and the completion of the works under it. The Crown gave the Trustees, free of any charge, 150 acres of the 170 above the dam in Wallasey Pool. Having previously given 100, the Crown then gave the whole of the Wallasey Pool above the dam, except 20 acres, the exceptions being only such bits of land as were cut off by our walls, the plan we came to Parliament upon having laid down upon it lines of walls which were to be built. Under the combined powers of the two Acts of 1844 and 1845 we had the means of making what is called the great float into a walled and deepened dock. Parliament required that the landowners should pay for the wall, inasmuch as the Act did not give power to collect wharfage, but only a toll upon vessels, and that the Dock Trustees should deepen the float. So far as dues upon goods were concerned, those public works were entirely free, and all parts of the works are now free. The object of the Crown in giving the land was for getting the trust as soon as possible out of debt, as I understood Lord Lincoln, so that there should be encouragement to all the parties holding the land upon the margin of Wallasey Pool to make docks, each man making a dock suited to his own wants, or companies to make docks suiting the wants of the public; that was the original idea. For constructing those works, the trust had power to raise what may be called a turnpike toll; that is, that all vessels, according to their tonnage, coming into the low-water basin, whether they went into the float or not, were charged a certain tonnage. The total capital authorised under the two Acts of 1844 and 1845 was a million of money, which it was considered the turnpike toll would pay, as the trust paid nothing for land. The sum of money authorised to be raised was a million; that included both objects, I think. The money authorised to be raised by the Trustees in 1845 included, as I understood, the additional cost of those works that had been imposed upon the trust by the opposition of 1844; 600,000*l.* was the sum authorised to be raised by the Act of 1845; 480,000*l.* was the sum necessary for walling and deepening the pool; and the money to be raised over that was the amount of excess. I proposed that we should have a stone-sloped embankment next the Mersey, and an objection was raised that it would be dangerous to vessels if they grounded upon it, and therefore we were reduced to the necessity of building a wall. There were many other things, which are matters of history now. The excess of the cost put upon us was provided for by the Act of 1845 to the extent of 120,000*l.*, as I understood.

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Grant of Crown for Act of 1845.

Rate, as a turnpike toll, on vessels only.

Cost of imposed works.

There was another Bill in Parliament, the same session, relating to the Dock Company; the Trustees Act was, so to speak, kept ahead of that; the works of the Trustees were the foundation of that Bill. The plan No. 3 represents, on the south side of Wallasey Pool, the works that

The Dock Company.

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were authorised by an Act of that session, which incorporated what has been called the Birkenhead Dock and Warehouse Company, who bought all the land upon that border—or at least they bought the leasehold interest. Various local parties, finding that those docks were likely to be carried out, bought that land of the Liverpool Corporation, and the company was bound to buy the land of them. In the session of 1845, there was a considerable opposition to the Dock Company's Bill by the Corporation of Liverpool, on the ground that the parties who had bought the leasehold interest were parties who sold it again to the Dock Company at a profit. Powers were obtained in the Act of 1845 for the purchase of the freehold of that land; the freehold of the land was never purchased; that was one cause of the difficulty into which Birkenhead fell. The Corporation continued to be owners of the reversion; amongst other causes of the difficulty of raising money, was the circumstance of the Dock Company being leaseholders; I always thought that very materially aggravated the causes of difficulty. The works, under the Act of 1844, were commenced immediately; I think the Act passed in August, and the works commenced in October. A year or two afterwards the Trustees were in difficulty, in consequence of some money which had been lent not being forthcoming. The difficulties into which the trust had come led to making the Morpeth Dock; the Morpeth Dock was made without the authority of any Act of Parliament. It was constructed upon a part of the land reserved by the Crown for the south reserve; the original intention was to make a passage into the float whilst we were building the other works. The Morpeth Dock was opened in 1847; the Woodside Basin was opened, I think, in 1846, and the Morpeth Dock in 1847. In 1847, there was a further reduction of dues by the Dock Trustees of Liverpool to the extent, as Mr. Bramley Moore tells you, of 40,000*l.* a year. The reduction took place principally, I think, upon East and West India produce, and the description of trade which might have been accommodated at Birkenhead; timber, cotton, and coal, articles for which the Birkenhead Docks were well adapted to provide; the report of the Liverpool Dock Trustees will give the whole particulars of what it was on.

Land questions with the Corporation.

Further reduction of rates at Liverpool.

Inquiry as to Morpeth Dock.

The Morpeth Dock was, as I have said, built and opened without the authority of Parliament; the construction was sanctioned in the session of 1847, after the dock was opened. Previous to the sanctioning of that work, Mr. Abernethy was called upon to report upon the works generally to the Admiralty; he was the surveying officer, under the Preliminary Inquiries Act. That report, from which some passages were read to Mr. Abernethy upon his cross-examination, relates to a preliminary inquiry upon the Bill to legalise that work; that was in 1847. A limitation was imposed in the Act upon vessels entering and using the Woodside Basin; there was a considerable opposition to the Act on the ground that, as Parliament had dedicated the Woodside Basin to the

public as a free basin, it was an unjustifiable infringement to pass vessels through it to and from the Morpeth Dock. The legalising the Morpeth Dock was opposed on the ground of interfering with the Woodside Basin by the Liverpool Corporation; on coming to Parliament for any limitation of restrictions, I have generally had the pleasure of a cross-examination by the Liverpool interest. In 1848 the trust had fallen into difficulty in consequence of money which had been loaned not being forthcoming; that led to a suspension of works. Application was made to Parliament in 1848 for a change of trust; the bondholders became dissatisfied with the local management, and an Act was passed, giving the bondholders a voice in the management of the trust. Upon that occasion also that Act was made the subject of a report by Mr. Abernethy and Mr. Laws. In the paragraph read to Mr. Abernethy from that report, the importance of completing the great tidal basin and the walls, and bringing it into economical use for general purposes immediately, was insisted upon; there is a recital in the Act of 1848 to that effect. The Act of 1848 effected a change of trust; by that Act the question of the level of the water in the float was settled by a clause, limiting the Trustees to running off the water down to 13 feet above the Old Dock sill. That had not been a part of the Act of 1844; we were not then restricted by Parliament to running it below that; but by the Act of 1848 there was a Parliamentary restriction that we should not run it below that without the consent of the Lords Conservators. In 1844, I think landowners were afraid of having the water too high; by the Act of 1844 the Trustees were restricted from penning up the water above a certain height; but in 1848 the views of the landowners had changed very considerably; they had become anxious to have the water as high as possible. Upon that occasion the lowest was settled at 13 feet above the Old Dock sill, and has so continued ever since, with the understanding that, in the event of any necessity for its being run lower, it should be by the authority of the Lords Conservators. This plan shows the state of things in 1848, upon which the Act was obtained; there are some graving docks: they were sanctioned in the Act of 1847. The Morpeth Docks had been constructed and legalised in 1847; the graving docks were authorised in 1847 by the Morpeth Dock Act; the plan now before the Committee, marked April, 1848, shows all the works, the low-water basin, the reserves, the Morpeth Dock, and the Woodside Basin, as then authorised by Parliament; that arrangement has not been departed from up to the present time, except that the Crown has given the whole of the south reserve; at that time the Crown only gave us the site of the Morpeth Dock and the site of those graving docks; then afterwards I was asked if any alteration had since been made; I say, yes; the Crown has given us the whole of that south reserve, which now belongs to the Corporation of Liverpool, who have bought the interest of the Dock Trustees. It was to encourage the parties to pay for the wall that the Crown gave up its

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Change of Trust in 1848.

Restrictions as to level of water.

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last twenty acres in those slips; there were further arrangements with the Crown in 1850 and 1853. In 1845 was the Act for the Dock Company; that which has been called the Warehouse Company; there was a Bill in the same year for extending the railway down to the docks; there was also a Bill for a railway to Manchester, which was lost upon standing orders; the Extension Bill to the docks was carried. This was the deposited plan of 1844, consequently the Railway Company were in Parliament in 1845. My original report in 1843 contains the following paragraph, in speaking of the low-water basin: "About the middle of the wall I propose to leave an opening of 300 feet wide as an entrance to a basin of upwards of 37 acres area, excavated to a depth of 12 feet below low-water spring tides, walled with convenient wharfs, and in every respect made suitable as a place of refuge for the numerous vessels now so frequently obliged to seek shelter by running aground on the sand-banks, which constitute its site; such a basin as this would obviously be a vast convenience added to the port for the accommodation of steamers, especially as they would be able to run to and from it at all times of tide, and obtain within it wharfage completely protected from wind, sea, and tides. The Irish mail-packets would, it is manifest, resort to this basin, as the Birkenhead railway (from London) would, of course, be extended along its wharfs, and the bags and passengers be passed without delay or inconvenience from the railway carriage to the vessel." I think it is essential to the public, without reference to the railway, that they should get access to the low-water basin, or rather to the river, and that the part of the river where that access is obtained should be as sheltered as possible. In 1844 the plan for the connexion of the Birkenhead or Cheshire Junction Railway with the low-water basin was deposited. The then station of the Chester and Birkenhead Railway was at the point called Grange-lane, which, with reference to that plan, is about there, and the railway company came to Parliament in consequence of the dock works, to extend their line through the town of Birkenhead to the basin. I was the engineer of the railway. The plan of 1844, as deposited, would have carried out my views, as expressed in my report of 1843; the plan shows the low-water basin; it shows the connexion of the railway up to the Dock Trustees' property; the property beyond the end of the railway was public property reserved by the Crown to the public. The railway company would have had free access by the rails on to the low-water basin. I do not remember whether there was any plan deposited showing the rails; but it is a matter of notoriety that the intention always was to carry the railway on to the low-water basin, because it would have been suicidal on the part of the trust not to have done so for their own purpose. The deposited plan shows the railway up to the limits of the works, and the land to be taken by the railway company; every inch of the land beyond was the land of the Trustees, ceded by the Crown, and reserved by the Crown to the public. If the low-water basin had been made,

Extension of railway to low-water basin.

Original report.

Railways to low-water basin.

the railway company would have been very foolish if they had not brought their carriages on to the quays of the low-water basin, because the Chester and Birkenhead Railway, and all the railways ending at Birkenhead, have a vast interest in the communication with Liverpool, and must depend for a very considerable portion of their traffic upon the Liverpool trade and the Liverpool Docks; and one of the strong recommendations of the low-water basin was, that it was opposite the centre traffic of Liverpool; that it was so near the Prince's Dock Basin, where the ferry steamers used to go, that it would be the best point for the ferry steamers to come to. By the Act the Trustees were required to place two bridges across the Morpeth Dock; they were required to place a bridge here, and were required to place a bridge across there, where it does not exist, to give the public access to the esplanade. I remember the Board of Trade reporting, in 1845, upon the projected railway to Manchester, and very favourably. The following passage in that report—"The Act of 1844 empowered the Commissioners to make a tidal basin, locks, &c.; and these works, together with other extensive accommodations for commerce, are now in progress. The area of the principal docks is said to be 150 acres, with 19 feet minimum depth of water; the tidal harbour will cover 40 acres, and be accessible to all vessels drawing under 15 feet of water, and there will also be a harbour of refuge and a beaching ground. The sill of the main dock entrance being several feet lower than the sills of the docks at Liverpool, vessels may enter the former in many states of the tide when the latter would be inaccessible to them"—relates, I presume, to the works that were sanctioned by the Act of 1844; there were no other works sanctioned. Having referred to the means of communication with Manchester, the report goes on to say: "The traffic of Birkenhead as a town, irrespective of the docks, could not maintain a railway towards Manchester, as it must still be regarded as little more than a suburb of Liverpool, where its principal inhabitants have their places of business, and whence they go to Manchester by the Liverpool and Manchester Railway. Birkenhead has, moreover, at present, but little trade in goods. The establishment of the docks, however, will cause great alterations, and the question depends on a prospective rather than a present view of what Birkenhead requires. If the present means of transit only are allowed, Manchester goods can be sent to Birkenhead for shipment only by one of two modes—the Liverpool and Manchester Railway or the canals. If by the railway, the goods must be unpacked from the trucks at Liverpool, shipped on board the river craft, and either landed at Birkenhead and reshipped in the outward-bound vessels, or transhipped from the river craft into the outward-bound vessels in the docks; either method being inconvenient, subject to delay, and likely to be expensive, on account of the goods being so often turned over. If by the canals, the Bridgewater, the Liverpool and Manchester, and Old Quay canals, the goods must be subject to the

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Ferry steamers to low-water basin.

Bridges at Morpeth Dock.

Report of Board of Trade, 1845.

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delays which attend all navigations, and the power of answering prompt orders will be denied to the manufacturers who may desire to send their goods to Birkenhead. It is the same with imports as with exports, the like rapidity and punctuality are essential, and there can be no doubt that railway communication with the docks, whereby goods may be sent directly from the manufactory to the ship, or the raw material received from the vessel without delay or interruption, or being unnecessarily turned over, would effect a saving to the manufacturer and to the merchant. Besides, the manufacturers of Manchester and the neighbouring towns attach great importance to Birkenhead, not only as a convenient place of shipment, but as a means of reducing the railway and canal charges generally, as well as the high dock and commission charges at Liverpool. The works at Birkenhead are rapidly proceeding; a portion of the docks are expected to be completed in less than two, and the remainder within three years. The warehouses belonging to the docks will be finished simultaneously with them; all will come into operation together, provided the means for bringing goods to the ships are, at the same time, ready; and we are therefore justified in presuming that the question for consideration is not so much as to a railway being made, as it is which of the competing railway projects is the best. No imperfect or partial measure can be suitable to the circumstances in which Birkenhead will be placed. In the great projects of that town large sums of money have been invested. It is essential to their success that the traffic flowing in that direction should be developed to the utmost; and the great commercial benefits which will be derived by the establishment of a rival port, so to speak, to Liverpool, can only be fully attained by the construction of such a railway as shall bring the docks into connexion with the greatest number of manufactories by the shortest route. Moreover, a low rate of charge on the carriage of goods is essential to the success of this great project; and any combination of circumstances having a tendency in an opposite direction must by so much mar the anticipated good. The results expected in a national point of view from the establishment of Birkenhead as a port, are reduced charges on imports and exports, and a consequent increase in trade, and these results cannot be obtained unless the railway charges be brought down to a low scale. The Birkenhead, Manchester, and Cheshire Junction (coloured red, and numbered 15 on the accompanying map) commences at the Hooton station of the Birkenhead Railway, and terminates at Manchester, with a branch to Stockport, another to Cheadle, and one to Bowden." The whole thing may be summed up in these words: that Liverpool, or the port of the Mersey, take both sides of the water, now is a port of transit; it is not a port of consumption. I should say that, whereas in London four-fifths of the whole imports are consumed, in Liverpool four-fifths of the whole imports go into the country; then it is manifest that it is of very great importance to the whole of the manufacturing districts that there should

The Mersey a port of transit.

be competition—I mean in railway and canal communication. Then, according to the design as then projected, and upon which this Act was obtained, the traffic from the steamers in the low-water basin was looked to as a material source; it was the low-water basin traffic that passed the Act all through that opposition in the year 1844. The low-water basin, in connexion with the railway, would be very essential for the river traffic. I was called upon to report, in 1846, to the directors of the then Chester and Birkenhead Railway, upon proceeding with their works. That report had reference to the ferry coming into the low-water basin in connexion with the railway, the present being an exposed ferry in the stream of the tide. The low-water basin, and the traffic that was to be furnished by it from the Irish steamers and Scotch steamers, the ferry traffic of the Mersey, was a most essential consideration for the extension of that line to the dock. The line cost a most enormous sum of money, which would have been absurd if it had not been for that. I should regard any plan which deprived the Cheshire Junction Company of traffic to be afforded by the low-water basin from those several sources as a departure from the original Act, by reason of which the company were induced to come to the low-water basin; I think it would be injurious for the Dock Trustees, as well as the railway directors, that there should be an interference with the free communication. That extension from the Grange-lane to the low-water basin, about a mile, at a cost of 300,000*l.*, out of which, I think, about 40,000*l.* was for works and the remainder for land, never would have been justified but for the idea that the docks would have been finished; the sum involved represented pretty nearly one-half of the capital of the company. I should not, as the engineer of the company, have felt justified in recommending that extension from Grange-lane, except upon the faith of the traffic which was to be brought by the low-water basin. The traffic upon faith of which this extension was recommended by me was the passenger traffic of the Scotch and Irish steamers, and the river traffic of the Mersey; that traffic included a large amount of cattle traffic and also goods. That extension line was completed in 1847. One of the very large works which we were obliged to make preliminary to all the others, was a culvert of two miles in length, extending from the marshes upon the whole of this line of road at about the level of low water; it is a brick culvert of 10 feet diameter; it was made in 1845 and 1846. It was to carry off the whole of the land-water of the marshes and the district above Wallasey Pool to the extent of about 12,000 acres, and the landowners compelled us to make that so large under the idea that their lands would not be adequately drained if we did not do so; we cannot drain into the float; the culvert was made pretty nearly at the level of low water. There is not much water in summer; and unfortunately, they make it a sewer, emptying into the Woodside Basin, just where they took the mud up, which has been spoken to here. In 1846 the culvert had been finished at an enormous

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Railway extended on faith of the low-water basin.

Culvert to marshes.

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expense. All the unproductive works at Birkenhead are done, and the productive ones remain to be done. We were compelled to proceed, in the first instance, with the unproductive works. There is the Woodside Basin and this great sewer; those are very expensive works, and wholly unproductive. The Morpeth Dock and the Egerton Dock, the 30-feet lock, between the Egerton Dock and the low-water basin, the end wall, and the whole of the sluices of the Birkenhead Fork, and the north reserve wall were completed by 1848.

The Trustees were so entirely out of funds, and it was manifest that they could not get back for a long time their funds which had been loaned; they thought it expedient to have some revenue at once, so they converted what was a temporary cut into Wallasey Pool, made for the purpose of draining the site of the Dock works, into the Morpeth Dock. The whole of the 400,000*l.* authorised to be raised under the Act of 1844 was actually raised within a month after the passing of the Act; and the parties were so confident that they could get the 600,000*l.* under the second Act, that they deferred raising it for a long time, and then when they wanted it they could not get it. I believe they only got about 25,000*l.* out of that amount. The 400,000*l.* raised under the first Act was absorbed in the non-productive works which we were compelled to do in the first instance and in loans; the Dock Trustees lent the money in various ways, so that when it was wanted for the works it was not forthcoming; the works were stopped for want of the money. The state of things was such, that, having failed to raise the additional 600,000*l.* under the Act of 1845, the Trustees found that, unless they completed the Morpeth Dock, or something like it, they would have no means of getting a revenue. It was a measure of expediency to which they resorted, having failed to get the money to complete their works; that was reported upon by Mr. Abernethy. It was considered that all the money that could be got should be applied to the completion of the works of 1844; steps were taken to pen up the water in the pool. It was then thought that penning up the water in the pool would be productive of a large revenue without the completion of the outer works, or, at least, I should say, pending the completion of the outer works. In 1850 some further concessions were made to the Trustees for the purpose of completing the works; the Crown gave them the whole land, with a small exception. The Crown gave up to the Trustees the whole of the south reserve, and paid the Trustees all the money which they had expended upon that wall of the north reserve which they retained, but it was on the express understanding that the land so given should be appropriated to the works then authorised. This is a copy of the minutes of arrangement. The concessions then made by the Crown to the Trustees were for the purpose of enabling the low-water basin and the works then authorised to be completed. The Crown gave all the land in Wallasey Pool, excepting the north reserve, to the public, and retained their rights round the margin of the low-water basin and the river wall

Origin of Morpeth Dock.

Grant of Crown rights in 1850.

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of the north reserve. Those grants were made upon the understanding that the works then authorised were to be carried out. The grant contains reservations as regards 100 feet in width along the north wall of the low-water basin. It has always been the case, every time we have been in Parliament, that parties have appeared to preserve those public rights. I have always understood that the public rights upon this south reserve and the north reserve had reference to the public rights in the low-water basin. Those further concessions were made in 1850, upon the understanding that the plans as sanctioned then, and in 1844, were to be carried out. The Chancellor of the Exchequer agreed to repay 22,000*l.* for the north wall if they took the north reserve. The rights which the public had at that period are preserved in that agreement, and the parties on the Liverpool side of the water have been always very anxious that those rights should be maintained; whatever might have been the interest upon this and other occasions, they expressed it by requiring clauses to be put in—that is notorious. This arrangement of 1850 having been made, a contract was entered into with Messrs. Brassey; in fact, the Act of Parliament was obtained almost upon Messrs. Brassey's proposition. The Messrs. Brassey, for doing certain works, were to take the south reserve at 140,000*l.*, as part payment. I believe, in 1853, there was a further proposition made by Messrs. Brassey for the completion of the entire works, to the effect that, if the Trustees would assign to them this further piece of land at 70,000*l.*, and pay them in their bonds at a discount of 6s. in the pound, they would receive the bonds and land, and complete the whole scheme. That proposition was accepted. The whole of the land which the Crown had given under the arrangement of 1850, in order to enable the works to be completed, may be valued at the 210,000*l.* which Messrs. Brassey agreed to take it at. Messrs. Brassey proceeded and made the dam, but did not go on to complete their contract. I believe Mr. Brassey assigned as the cause that money was the difficulty, that the Birkenhead Trustees bonds were not marketable. The Liverpool Trustees brought out that scheme for the north docks, proposing an outlay of 3,500,000*l.*; and Messrs. Brassey took some alarm lest that plan, if prosecuted, should so depress the value of the Birkenhead Docks, that they would be a dead loss. Messrs. Brassey assigned over and over again to me as the reason, that, in the face of what the Liverpool people were going to do, which would be a provision for all the trade of Liverpool for the next twenty years, it was casting upon them a fearful risk to go on with those works, they having embarked so largely in the Birkenhead Docks as a speculation. All the Birkenhead measures have experienced opposition upon every occasion from the Liverpool Dock Trustees, and that north-shore scheme so brought out finally put an end to Birkenhead. In last session an arrangement was come to by which the Corporation were to take to the Birkenhead works; I myself advised, in my evidence before Parliament, that, rather than burden the Birkenhead Trust

Reservations for the public.

Contract with Messrs. Brassey in 1853.

Alarm at north-shore scheme.

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works with all these additional costs consequent upon such arrangement with Messrs. Brassey, it would be better to hand them over to Liverpool, if the Liverpool Dock Trustees fairly represented the whole public. I would rather not offer any opinion upon the question whether the Liverpool Dock Trust, as at present constituted, represents the public; that is a question for Parliament, not for me.

Variation in plans.

The plan on the wall, marked 1853, is substantially the same plan as the former plans, generally speaking; I never saw it before; I think that is the contract plan; I should say, not having seen it before, or measured it, that it represents the contract plan of Messrs. Brassey. I have been gradually making the locks larger, because the trade got larger; but the only difference between this plan and the plan No. 4 is, that the low-water basin has been reduced in size—not in length, not in wharfage, but in water area. It has been reduced from 35 acres to 27 acres of water surface. The date of the plan No. 4 is 1850. No. 2 was the Parliamentary plan that passed in 1844. No. 4 was my plan of 1850. The marked difference is this, that we get the lock 500 feet in length and 100 feet in breadth, which we could not have in the other plan. The basins are the same length, which I hold to be the most important. The plans are all the same in principle, having a large low-water basin modified by the circumstances of the trade as regards the entrances. The soil for the excavations which Messrs. Brassey had undertaken to make in the float in connexion with those entrances, was to have gone in forming those two pieces of land out of which we were to derive so large a sum of money for the works. The excavations would about make that land. The Crown was so considerate that it did not press upon us to put more of those excavations upon the north reserve than would suffice to back up the wall, considering that they had given us those lands for the benefit of the public, and that the excavations were properly arranged at the time. Messrs. Brassey's engagements were to undertake the works of their first contract for 208,000*l.*, and of their second contract for 370,000*l.*, together 578,000*l.* That included the works already mentioned and 30 acres of deep excavation in the float. The 578,000*l.* was taking those bonds at a discount. We paid them 20s. for 14s. worth of work. The money value of that contract of 1853 was 474,000*l.* That was the contract referred to, the execution of which was suspended, according to my belief, by the threatened execution of the north-shore scheme at Liverpool. That was the reason assigned by the contractor repeatedly to myself.

Difference between bonds and cash.

Principles of authorised plan.

The plan marked 1853 upon the wall, except with regard to the alteration of dimensions, is substantially the same plan as originally suggested; the principles are precisely the same; in coming to a determination upon that plan, as affording the best accommodation to the Mersey, the sand-banks in the river and other peculiarities formed an important consideration. It was very apparent that the docks on the Liverpool side had been designed with reference to the peculiarities of

that side and of the tides in the Mersey, those peculiarities being the difficulty of keeping sand out of the entrances; and the necessity, therefore, that existed there of having the sills laid at a high level, brought about the further necessity of confining the period of time when vessels could dock to about high water, because it was quite clear that vessels could not run out of such a stream of tide as there is in the Mersey into the entrance, unless it was sufficiently large for them to clear the entrance; hence it was apparent to me that, if we were to have deep sills, with a view to vessels coming into dock as soon as they arrived in the river, we must have those entrances situated in a basin sufficiently large for vessels to congregate, and take their time to go into dock, because one or two vessels at the entrance of the largest kind would occupy the entire docking-room of that particular dock. The flood tide brings in a large quantity of sand from those banks at the mouth of the river; the breaking of the tide on those banks takes up a large quantity of sand and brings it into the river, the set of the tide being as I will describe: the tide comes up from the westward, and here we have very deep water; a considerable sea runs up in if there is any wind, and, in breaking upon these banks whilst the currents are running upon these swashways into the Mersey, a large quantity of sand is brought in. The course of the large vessels is mostly to the west of the bank; the consequence of that is, that the direction of the flood tide being over those banks, as soon as the banks are covered, a considerable deposit of sand takes place along this shore, this being the shore upon which that stream first impinges. The difficulty is very properly described by Mr. Hartley, that those basins become filled with sand, or at the least the sills become liable to be choked by that sand. On the Birkenhead side we are comparatively exempt from that difficulty. The peculiar position of Liverpool, with reference to the sea channels and the sand-banks, indicated to me that deep sills could not be had at Liverpool. The same consideration, with reference to the set of the tides, indicated to me that deep sills might be had at Birkenhead; provided you recess them from the river you can have them, otherwise I do not think so. The position of those different works on the two sides of the Mersey, with reference to the set of the tide in the Mersey, suggested to me that which has been explained by Mr. Hartley and other witnesses, namely, the greater amount of deposit on the Liverpool side; their evidence is quite consistent with what I then expected. The sand that is brought into those entrances is very clean sand; as a rule, you will find occasionally a silty deposit; but it is a very clean sand; the quantity of water coming in from the sea in the Mersey is so infinitely in excess of the quantity of land-water draining, that you must look for nearly all the débris in the Mersey as being due to the salt water, and not to the fresh. The area of the estuary above Liverpool, or of the river at low water, is very small; at Runcorn it becomes nothing. The peculiarity of the Liverpool estuary is this, that the Lancashire land runs off far to the north-

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A large basin essential to deep sills.

Sand from banks at mouth of the Mersey.

Deep sills impossible at Liverpool.

Peculiarity of the estuary.

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ward of the Cheshire land, thereby stopping the flow of the flood tide up the channel, and throwing it into the narrows at Liverpool, through which the tide runs with immense velocity; in fact, it is a large specimen of sluicing; it rushes through with immense velocity, and, although at the bar you have only 11 feet of water, you have opposite Liverpool 60 at the same time; and then again about two miles above Liverpool, you have not more than about 8 or 10 feet, so that it is a great gorge scoured out by the tide which rushes through it; for the same tide that rises at Holyhead, for instance, only 18 feet, will rise at Liverpool 27 or 28. The prevailing wind at Liverpool is westerly, I dare say, eight months in the year. Those winds add to the quantity of deposit on the Liverpool shore; that is a result, so far as the deposits are concerned, from which we are comparatively free at Birkenhead,

Character of the deposits.

that being the lee side. The great peculiarity of the deposits is, that you will find a coarser sand on the one side than on the other. I consider deep sills essential to the trade of the Mersey. Very frequently you have large fleets arriving, and of course every vessel when she gets opposite Liverpool, wants to get into dock as fast as possible; at present they are obliged to beat about in the river until they can get in. The Liverpool Docks are only opened near high water; the bar is 13 miles below Liverpool; those vessels that cannot pass the bar, coming up at spring tides, wait till they can get in; the detention of the larger class of vessels outside the bar for want of water, leads to a considerable accumulation of arrivals at about the same time; every vessel, finding herself incapable of passing the bar, waits there until the tide flows sufficiently for her, and then, as a matter of course, there is a race which shall get first up to the dock. The quantity of small craft, of river craft, and of steamers in the Mersey is very great; if you take the number of acres of dock accommodation at Liverpool, and divide it by

Entrances at Liverpool.

the number of entrances, you will have about one entrance to each 10 acres of dock; so that for 177 acres of dock, you have now 18 entrances, and those entrances are necessarily, for the convenience of vessels passing them at high water, spread over about 4 miles of shore, so as to prevent crowding. The circumstances of the Liverpool shore render it essential that they should have so many entrances. I think where you dock at about the time of high water in an exposed estuary of that sort, without basins, you must have that number of entrances if you have trade to fill your docks. Whether at Liverpool or at Birkenhead, it is necessary that the entrances should be at right angles to the stream of the tide. I am sure I need not say to any member of the Committee that to take a vessel with the tide, running perhaps 5 or 6 miles an hour, across the stream, and put her into a small basin which she cannot shoot, is not a very easy operation; therefore, if you dock when the tide is running, I contend you must have a basin sufficiently large for the vessels to run into. If you do not dock at high water, there is no such necessity, but then you come back to the other mode. If you dock at high water,

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you must have numerous entrances. If they could maintain deep sills at Liverpool, such sills would not, I contend, be available with the small basins they have there, or at Birkenhead either. You will find that in the ports in England, where vessels are in the habit of entering the docks at high water, for instance, in the Thames, the docks are in the same proportion of one entrance to ten or eleven acres of dock; that is the case with the East and West India Docks, the London Docks, and all the docks in the river Thames; that is about the proportion. Unless, then, you have a large basin, there is no alternative but a number of entrances. I have here a paper derived from the Liverpool Dock returns. I wish the Liverpool Dock Trustees would publish these papers, for they would be extremely useful to engineers. But this is a description of paper not published. It is a statement of the number of vessels which have entered and left the Liverpool Docks, together with the number of flats which entered during the months of July, August, and September, 1851. The total number of vessels which passed into the docks in those three months was 6425; that would be 70 per day, which would be four vessels to each entrance; and if you take this table which I hold in my hand, you will find that the vessels have passed with very considerable uniformity into the different dock entrances, and the average would be four vessels per day to each entrance. Then the number of vessels that went out of the docks in the same three months was 6324. The number of flats that went into the docks in those three months was the astonishing quantity of 7595; that was in July, August, and September. The flats go into all the docks except three, I think. They do not go into the Clarence, they do not go into the Trafalgar, they do not go into the Victoria; but they go into all the others. According to this return, very few indeed into the Salisbury, very few into the Bramley Moore, but tolerably distributed over the others; however, I see into the Waterloo, the Prince's, George's, the Canning, and the Queen's, is the chief. But it would be a most interesting thing, as these are trust docks, that there should be returns, because it is not merely with reference to the Mersey, but it is a most important thing with engineers in designing docks to know about what is the capability of an entrance as a practical question. I find the number of flats that entered the docks per day to be 83, which per entrance, taking the 18 entrances, would be between four or five. I merely produce this to show that, if you will dock at high water, and have small basins to dock with, you must have numerous entrances; you cannot carry on the business without. There may be very nearly the same number of flats going out. I do not see how you can by possibility concentrate the same quantity of trade into one entrance that you would into 18. The very fact that you are going to run into that entrance out of such a stream of tide as I have described, and as other witnesses have told the Committee, implies that you are going to warp the vessel alongside the pier-head, and if you warp that vessel alongside the pier-head, it is impos-

Proportion between entrances and area of docks.

Number of vessels passing entrances.

Numerous entrances essential with small basins.

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sible for you to pass a great number of vessels; it is inconsistent, particularly if there was any weather up. Judging from the experience of the Liverpool Docks, and assuming the same quantity of trade with the same area of dock at Birkenhead, you must have, I suppose, the same number of entrances at Birkenhead as at Liverpool, if you adopt the Liverpool system; that is not at all practicable, looking at the position of the dock.

Position of float at right angles to the river.

The position of the Wallasey Pool, or the position of the float as to the Mersey, is totally different from the extension along the shore at Liverpool. They have filled up their float at Liverpool. There was a pool at Liverpool, from which it derives its name, but that is all filled up and made into land; but the Liverpool Docks are formed wholly on the foreshore, and extend, as one of the witnesses told the Committee, four to five miles along the shore of the river. The trade therefore into the 170 acres of dock is distributed over four miles of river; they do not consequently get any crowding at one particular entrance. But at Birkenhead you cannot follow the same arrangement; Wallasey Pool runs at right angles to the river inland; the frontage to the river will be monopolised by one entrance. Mr. Hartley's plan is a repetition at Birkenhead of the same system that was adopted at Liverpool. Upon this question of entrances only, that system is not at all applicable to Birkenhead for a dock running in at right angles to the river. Dealing with the quantity of trade entering into these four miles of entrances, you must provide at Birkenhead, with reference to the position of the pool being at right angles to the Mersey, a totally different description of entrance. You must give to the mouth of any docks that are to be contained in Wallasey Pool a harbour entrance out of the stream of the Mersey, which harbour shall represent all the facilities that the vessels now have at Liverpool scattered over four miles of shore. Having regard to the natural capabilities of the two places, there is not the smallest analogy between them; the natural features of the two places, in my opinion, require to be treated differently. I am making an entrance at the London Docks now: we do not provide any low-water basin, because it is not necessary, although I am making the sills very deep. I should not think of making a basin there, but the London river and the Mersey are entirely different places. Looking to the position of Wallasey Pool, with 150 acres of dock there, and comparing it with the position of the Lancashire shore, with 170 acres of dock there, with eighteen entrances, the necessity for the number of entrances can be supplied at Birkenhead by no means but by having a large open basin accessible whenever vessels can come in over the bar either by steam-tugs or by wind. I do not think you can accommodate the trade which might be properly carried on in 150 acres of dock in any other way in that situation than by a low-water basin. Entrances of the kind Mr. Hartley proposes would be virtually shutting up that dock. I think that Mr. Hartley's plan is better by far than Mr. Abernethy's, because by Mr. Hartley's plan, whenever you can get a vessel pointed

Liverpool system inapplicable at Birkenhead.

Mersey and Thames wholly different.

Comparison of plans of Hartley and Abernethy.

in his low-water basin, you can get her into the dock, whereas by the plan of Mr. Abernethy—the half-tide plan—it would be hermetically sealed during six hours of every tide. You could not pass in or out. Mr. Hartley, therefore, has proposed a remedy for that inconvenience. But I think the great defect is, that while Mr. Hartley has been proposing deep sills, his plan does not give an opportunity for the number of vessels that would have to go into the 150 acres getting in without crowding, which would be perfectly destructive to everything entering it in bad weather. The whole length of the basin from the stream of the tide to the gates is not more that 400 feet. I do not agree with the witness who said that four or five vessels could run in there one after the other. Assuming that only one vessel can go there at a time, it would be virtually shutting up the pool; in fact, I do not see how, when the stream is running strong in the Mersey, a large vessel can be pointed to go into those locks without occupying the whole basin. In order to afford the required accommodation, you must have a low-water and a sheltered basin. I will give you the currents that run along there. As regards Birkenhead, there is a stream of tide running there (*describing the same*). The heat of the spring tide there is at about three hours' flood, because the tides in the Mersey rise as much as 7 feet 6 inches in one hour; from the second to the third hour the rise is 7 feet 6 inches. At that tide the stream is so hot just off where the M is in the plan of 1850, that it runs at from five to six knots an hour; the flood tide in springs, a little further out from the shore, runs as much as six knots. The Committee will understand how forcibly the tide runs there when I can say that I have found the rocks which are bared at low water almost bare of any clay or sand, just where the letter E is in "Mersey," and the sections which I will lay before the Committee will show that those rocks are really the things which will interfere with the scour of the stream in deepening the bed so much, as it is at Seacombe and Woodside. The Mersey, opposite the proposed entrance, near the letter E in the channel, is scoured bare; it is very fortunate they have such a stream, otherwise there could be no deep sills there. If you are to afford an entrance at all times to this great float, you must have a basin into which vessels can run at all times out of the stream of the Mersey, and in which they may take their time to go into the dock. That basin would afford an effectual shelter for vessels at all times, and would be sufficiently still water to enable them to dock. The greatest indraught upon the flood tide would be a mere trifle; it would not exceed a quarter of a mile an hour; and when the gates are open, that is, as soon as the tide reaches above 13 feet in the low-water basin, it would be about the third of a mile an hour. The vessels would run into comparatively still water and safety, where they could wait their time to go into the dock. They could there be handled with all ease, and pass into the dock. It would be available for vessels not drawing above a certain number of feet of water at any time of the tide; all vessels that

J. M. Rendel, 27 May, 1856.

Stream of tide in the Mersey.

Velocity of indraught to low-water basin.

J. M. Rendel, 27 May, 1856.

enter the Mersey come in over the bar with the flood tide. There being over the bar about the same water as in the low-water basin, a vessel is quite sure, having passed the bar, to find water in the basin when she arrives at it; and, therefore, whenever a vessel can arrive opposite the basin, there is water sufficient to enter it. I propose that there should be 12 feet of water at low water at spring tides in the basin; any vessel drawing less than 12 feet could enter at dead low water. The rise of the tide in the Mersey is more than 14 feet in the first three hours. Vessels of the largest class that have waited outside the bar for water would find water at the basin when they could get in over the bar; that was the object of the 12 feet below low water. If you are to have an available entrance to 150 acres of dock, it is essential that you should have that depth of low-water basin, unless there were numerous entrances as at Liverpool. You must have in the one basin all the accommodation they have in those various basins at Liverpool, and something more—you must have depth and size, and width of basin, and also shelter. We obtain all those four conditions eminently in that basin. Length for vessels to run in is a most essential thing. It is perfectly impossible to run into the Liverpool basins, excepting with smacks, and in that case with great danger. It is absolutely necessary to the Liverpool system that the vessel should be brought along the wall and warped in, as in the London Docks, and as in the East and West India Docks, and other docks. Under such a system as the Liverpool system, more than one vessel cannot go in at a time without danger. Vessels, where you have a small entrance-basin into which vessels cannot run, must be warped in. That is the reason why they cannot have more than one passing in at a time with safety in bad weather into a small basin. Having regard to the trade of the Mersey, the quantity to be accommodated, and the number of vessels that enter the 170 acres of dock at Liverpool, that could only be done with a dock at right angles with the river, by a low-water basin. I say that out of the 27 acres which that basin contains, I could set apart, perfectly out of the way of vessels entering the Birkenhead Fork, and perfectly out of the way of vessels entering the basin—ten vessels to an acre, ordinary vessels—and I could appropriate at least five acres for those—that would be fifty vessels, and they would be there instead of beating about in the Mersey. I consider that basin to afford the means of accommodating, with the two locks and a gate passage, all the vessels that would trade to that 150 acres of float. I assume that I have to provide for the same number of vessels coming to Birkenhead as to Liverpool, acre for acre; and having regard to the capacity of that basin, it would afford the accommodation which the sum of the entrances at Liverpool affords, simply because you extend the time of entering the harbour or the basin each tide, over a very long time of tide, whereas at Liverpool you must dock just at high water. It would accommodate each tide, and take into dock each tide, all the vessels that are now taken in through the eighteen entrances at Liverpool,

Depth of basin from river.

Number of vessels accommodated in low-water basin.

extending along four miles of shore. That, I think, is the only way in which you can get rid, as I said before, of what is a necessity, shown by experience, namely, that where you dock at high water, you require for every ten acres of dock one entrance; and I do not see how you can get over that except by some such arrangement as I propose. That arrangement was forced upon me by the peculiarity of the case, having two miles of dock at right angles to the stream of the Mersey, instead of four miles along the shore of the Mersey. It was in order that you should have no crowding at the basin by vessels waiting to go into it, and that you should have no crowding at the locks, because the vessels would be taken into them afterwards. The necessity of such a low-water basin is imposed by reason of the position of the docks being at right angles to the Mersey. I would illustrate the question of the shelter once more. It was thought by parties in 1844 that this pier, which was a mere slip-way, must be raised to a high-water pier for the shelter of vessels in this basin. Now, if that was necessary for the shelter of vessels in this basin, which was the Liverpool view, I would ask any one what must be the amount of sea in a basin of this sort, placed where it is surrounded by a wall, where every wave that ran in would recoil and run round the basin. In Mr. Hartley's entrance there must be a great amount of sea—it could not be otherwise; there is no room for the wave to expend itself. A wave entering the low-water basin would be expended immediately the wave passed the narrows of the mouth of the basin; it would pass into the larger space, and be expended upon the water. There is nothing that knocks down a wave like water. There would be in Mr. Hartley's basin, at times, a disturbance in which no vessel could live. That disturbance, which would prevent a vessel living in Mr. Hartley's basin, would be effectually prevented in my basin; in the upper part of my basin, towards the lock, there would be, practically, still water at all times.

J. M. Rendel, 27 May, 1856.

Low-water basin to meet the peculiarity of the case.

Sea in Mr. Hartley's entrance.

Friday, 30*th May*, 1856.

James Meadows Rendel, further examined by Mr. Webster.

J. M. Rendel, 30 May, 1856.

The area of the low-water basin is 27 acres according to the present authorised plan, the length in each case being the same, but with some contraction made in the width. The original one was larger, but the length the same. The distance of the lock from the Mersey is the same upon all the plans. The contraction is at the entrance from the Mersey; the reason for the contraction, so far as I am concerned, is this: it was made in order that we might increase the rapidity of the stream coming from the sluices as it approaches to the river, so that we

J. M. Rendel, 30 May, 1856.

Object of Birkenhead Fork.

might remove the heavier portions of sand which would in all probability be deposited near the river. The Birkenhead Fork was designed specially for the accommodation of the river traffic and the smaller class of shipping, including steamers, and to give as much value to the south reserve as we could by making a convenient wharf upon its margin; this has always been looked upon as a wharf of very considerable importance from here to there (*pointing out the same*), and also from there to there; the south side of the Birkenhead Fork, I mean. I think the public at large, and the railway companies in particular, are very much interested in those wharves on the low-water basin. It is by means of that fork that the railway companies are to get the passenger traffic, or a considerable portion of the passenger traffic, of the Mersey. I do not think they can get it in any other way; the number of steamers from Liverpool to Birkenhead at the various ferries is something enormous, and undoubtedly the railway companies, whose lines terminate at Birkenhead, are considerably interested in the passenger traffic by those steamers; there is no question about that. The plan of Liverpool will show that this is the chief passenger landing-place upon the Liverpool shore, the large landing-stage being immediately opposite to the great basin at Birkenhead, and there is no doubt that that would be the most convenient passage for passengers coming to the railway; indeed, it is quite out of the way to go to Woodside, and still more out of the way to go to Monk's Ferry, or to Birkenhead, or to Seacombe. The ferries are small; there is a ferry from Egremont, a ferry from Seacombe, a ferry from Woodside, from Monk's Ferry, and from Birkenhead proper, and from Tranmere. I think ultimately for local traffic, because I cannot but foresee that the construction of docks will bring the population of Birkenhead more to the margin of the docks. The Committee would fancy that those are all houses built; that is not so. The owners of land have, at a very great cost to themselves, laid out, I suppose, some 20 miles of streets ready for building; and I have no doubt that the completion of the works would have the effect of getting a larger portion of the population of Birkenhead in this direction; in fact, on the south side of the great float. It would not interfere with the shipping; the passenger boats on the Mersey steam both ways, and I do not think there would be any inconvenience. The Birkenhead Fork was intended principally for the coasting steamers, the river steamers, and the Irish steamers; not the ocean steamers; it was only meant for the accommodation of the ocean steamers as an entrance to the float; all the coasting steamers ought to come to the Birkenhead Fork. The ocean steamers might be anywhere in the basin, excepting at low water of spring tides. I think about half the year there would be never less than 15 or 16 feet of water in the great low-water basin, as originally designed; you may take it in this way, that 6 days out of every 14 you would have that depth of water in the low-water basin at low water. The spring tides will have risen 7 feet up to the end of the

Ferry and local traffic to low-water basin.

second hour, so that, adding that on to the low water of spring tides, you would have before the end of the second hour at all times 19 feet, even at spring tides. Very few of the Scotch and Irish boats draw more than 13 feet. I believe, generally speaking, 12 feet. The Holyhead boats are 12, or less than 12; say from 10 to 11½ feet. I know that from the fact, that when we deepened the old harbour of Holyhead it was required we should make it 12 feet. At Glasgow and Dublin the steamers take the ground; at Kingstown they ought not; they do not take the ground at Holyhead, and there we have only 11½ feet of water at the old harbour. In Dublin they do; and in the Clyde the largest ocean steamers sue something like 6 feet water; that is, they ground or are mud-borne to that extent. In my opinion, the accommodation to be afforded by that low-water basin in connexion with the railway, is better than can be afforded by a landing-stage in the Mersey; because, if a rising and falling float is the best description, and I think it is under most circumstances—if a rising and falling float, so that the deck and the float should be always at one level above water, is the best mode of landing passengers and goods from steamers—then the simplest arrangement in the world may be made along the south side of the Birkenhead Fork. We have only to make recesses in the wall, say 200 feet long and 25 feet recessed, that would take a vessel 200 feet long and 25 feet wide; they approach there, not by gangways at right angles to the wall, but by parallel gangways to the wall, and you would have three or four such stages in the length of that side of the Birkenhead Fork. The length from that point to the Egerton Dock is about 1000 feet. I should recess the landing-stage; a recess of 200 feet would be quite long enough; no steamer would desire, if she monopolised all one stage, more than 200 feet in length. The slip, as originally intended, was 16 feet—wide enough for a carriage to drive down; for a passenger carriage to drive down to convey persons on to the steamers; the working drawings are all got out. I can produce them. If there were no stage I should have put a slip. It is quite a matter for the persons interested in the traffic to decide whether there shall be a stage or a slip. There might be several stages recessed in the wall, each 200 feet long; it is a very long wall. When one recollects that all the river traffic at present at Liverpool is carried on at one stage, the length of which is about 500 feet, I should say that four such stages as that in the Birkenhead Fork would do any amount of traffic, either in goods or passengers, that might be desired. There is room there for four such landing-stages of 200 feet each—that is, 800 feet altogether. That class of accommodation is the best for the public; because you will see at once, that if a landing-stage in the open river is a good kind of accommodation, a landing-stage in so sheltered a basin as this stage must be a better accommodation. That kind of accommodation would be compatible with the use of the Egerton Lock for an entrance to the Morpeth Dock, because the pontoons or floats would not project beyond the line of the wall.

J. M. Rendel, 30 May, 1856.

Landing-stage in Birkenhead Fork.

Landing-stages recessed in the wall.

J. M. Rendel, 30 May, 1856.

There would be room between those portions and the steamers lying at them for vessels to pass up the Birkenhead Fork to the Egerton Lock; the Birkenhead Fork, except at the narrow entrance, is 400 feet wide. There would be room in the other reserve for the use of that quay for trade also. You might overcome by that arrangement all the objection that would be raised to that for traffic either of goods or passengers, because you would almost get rid of the craneage. I am sure I need not say that no small vessel would go into the dock if she could equally well be accommodated in the large basin. A railway station on the south reserve has been repeatedly contemplated; and there, I should say, it ought to go. It would be better there than on the other side, on account of the interference with the opening from the Egerton Dock into the great float; and it must be recollected, that when these large works are carried out, there will be very few vessels passing to or from the float through this Morpeth Dock; indeed, it would be inconsistent with the convenient use and profitable working of those docks that that should be the case, for those docks are very narrow. They will be put to the same use as at present; an enormous deal of business is carried on there; they would cease to be a passage; they would be places most valuable for railway traffic. The coal trade is carried on there; owing to the peculiarity of the coal, they prefer putting the coal on board in barrows; it does not break it so much. The upper end of the Birkenhead Fork, with regard to works, is finished. The walls there are vertical, and very high; they are about 50 feet high from the foundation; the quay, at two hours before high water, would be about 14 or 15 feet above the water; that is a model of the work as finished (*producing the same*). This is towards the basin; this is a lock made suitable for passing river craft in, and it will also accommodate a vessel of about 400 tons; those are the sluices, and, in order that vessels may not be damaged by the sluices, the water passes under these arches, and is sluiced, so as to have as little disturbance as we can, but to have a great current; that work has been finished, I think, eight years. This is the model of the lock, and the sluices at the top of the Egerton Dock. That lock will accommodate vessels of from 400 to 500 tons, according to their build; it is only 30 feet wide. The Birkenhead Fork is 10½ acres, the main fork is 16½ acres. Taking the class of vessels, of which there are 13,000 out of 17,000 going into Liverpool, according to Mr. Hartley's evidence—taking that class, you might put there, and leave the open space I spoke of just now, sixty vessels; and, if you take river craft, perhaps twice that number; and which sixty vessels could enter and depart at all times of the tide, low-water springs included; because it is to be remembered that out of these 17,000 vessels which Mr. Hartley told us entered the Liverpool Docks, I think, in the year 1854, 13,000 and odd were vessels drawing 12 feet and under. Now, 12 feet is the lowest water we should have in the basin, because that is the depth of low-water spring tides; however, those vessels might always

Railway station on south reserve.

Number of vessels in Birkenhead Fork.

be afloat and trade there. That number would be accommodated in the 10½ acres of the Birkenhead Fork. I should suppose the harbour master must keep the entrance clear in the main arm of the basin; and if you therefore assume that entrance to be kept perfectly clear, and to have all the remainder for stowing vessels, if you wanted to stow them, you would have about 10 acres there also available—say 8 acres out of the 16½ acres. It would not be right that vessels should be allowed to collect between the entrance and the mouth of the great lock; but the part above the mouth of the great lock ought to be, and is intended to be, the place where vessels would collect before they entered the float above the lock gate, and where they might collect in very large numbers indeed. You might collect at least 50 there with very great convenience of the same class as just referred to, or you might put a smaller number of the larger class; there is depth of water there for them. *J. M. Rendel, 30 May, 1856.*

All the river craft move about with a steam-tug in trains; the craft are formed into a train, and the steam-tug is the locomotive to pull them. In designing docks, I look upon the providing for that species of train a consideration of the utmost importance for the despatch of business for that description of craft. When one looks at the enormous number of craft of that kind, I believe, unless you give the greatest possible facilities for forming them into trains, and getting them away from your basin rapidly, you cannot carry on the business of 150 acres of dock—through the one basin proposed you cannot do it; if it could be done, then an enormous sum of money has been thrown away at Liverpool. Now, I do not believe Mr. Hartley has thrown away money at Liverpool, and I believe the necessity for those entrances that we find existing there, and the large number of them, has reference to enabling those trains to go up the country—to all parts of the country; everybody knows the enormous canal ramifications and navigation communications with the Mersey. Those trains are the means by which this large import trade is distributed into the manufacturing districts; the vessels that go in the trains are the flats. I do not think it would be possible to carry on the large trade of the Mersey through one entrance arranged as Mr. Hartley has arranged his. If there is any sea up in this small basin, you could not form your barges into trains, and if you stop until you could open this passage and take out your trains on a level, then I say you would so interfere with the passing of vessels, the larger vessels, into the 150 acres, that you could not carry on the trade in that way, and it would amount to a necessity for your inconveniencing the barge traffic; that is my opinion; if not, then eighteen entrances for 170 acres at Liverpool must be unnecessary. It would not be practicable for the Sandon Basin, for example, to work the trade for 150 acres. That is rather an apt illustration, because, supposing we were to pass the traffic of 150 acres of the Liverpool Docks through the Sandon Basin, and had to pass all the traffic of that 150 acres, which would amount to all the docks of Liverpool up to about this point—had

River craft in trains.

Mr. Hartley's entrance inadequate for such trade.

J. M. Rendel, 30 May, 1856.

to pass all the traffic through that entrance-basin, which is double the size of Mr. Hartley's Birkenhead Basin—it would be utterly impossible to do so. My opinion is, if you have but one entrance to 150 acres of dock, it must in itself contain all the accommodation of a harbour. I was supported in that opinion in 1844 by Sir William Cubitt and other persons. Sir William Cubitt was so pleased with the plan, that I believe, in a great measure, he took credit for many parts of it in 1844, and he always called it our plan.

One entrance may be sufficient.

Sills of entrances.

The depth of the sill of the entrance to the great float is to be 18 feet 6 below the Old Dock sill, and of the great lock 17 feet; the gate entrance is 10 feet. These sills, being tide-gates, are only 10 feet below the Old Dock sill; these being lock sills, that sill is necessarily placed with reference to the excavations in the float. This sill is the same, but then we lock up here. The arrangement of the plan is to distribute the entrances into those 150 acres as much over the basin as we can, so as to avoid the interference arising from the passage of one vessel in or another vessel out; or, in fact, so as to save their time. We shall have two locks and one tide entrance. The objection to Mr. Hartley's plan is what I have always had to a plan of that kind, that is, having three entrances so close together; because if you have several vessels passing at the same time so close together, if there is any wind or sea up, or tide running, there is a great confusion or difficulty and peril in passing. I cannot see anything like three entrances so close together on the Liverpool side; Mr. Hartley has been careful to keep the entrances as much apart as he can. The sill of the dock of the Sandon Basin is only 6 feet 6 below the Old Dock sill; the sill of Mr. Hartley's Birkenhead Basin is, I think, 17 feet below the Old Dock sill; that increase in the depth of the sill of Mr. Hartley's Birkenhead Basin, as compared with the entrance to the Sandon Dock, does not remove the objection I have pointed out. I think still, after the most impartial consideration, that if you wish to derive advantage in the Mersey from deep sills, you must place your vessels in a perfect state of shelter before you point them for your entrance. It is essential that you should have a sheltered entrance in a tidal river like the Mersey. If you want to concentrate all the traffic due to a dock of 150 acres, you can only do so with safety and without inconvenience by making an entrance-harbour, and so separating the lock-gates and communication in that harbour, that the vessels passing to and from 150 acres of dock shall not confuse one another. The Wallasey Pool, in its natural state, extended from here to there; but here is a stricture, there is the pinch, and that is the limit (*describing the same*). It is really a matter of grave importance, as far as docks are concerned, that provision should at once be made for this enormous extent of available land; within this stricture there are, I think, as much as 2000 acres of marsh land, affording means for any extension of docks, the surface being from 6 to 8 feet below high water, and where, there-

Sheltered entrance harbour for deep sills.

Land for docks on sides of Wallasey Pool.

fore, docks might be made to any extent. I speak from this point on the south side, extending away there. There are wonderful facilities there for docks. Both sides may be taken, but chiefly on the south side. What is very important, with reference to the development of the dock system in the great port of Liverpool, is, that you might have there a competing system of docks. Proprietors might make docks so cheaply entered at this entrance, that it would effectually check any combination; which, looking to Liverpool as a port of transit, is, in my judgment, a matter of the utmost importance. I can show the Committee how it is from this plan (*exhibiting the same*). Now, here these are all marshes of about 8 or 10 feet below high water, all enterable from this float; they are capable of affording dock accommodation of the cheapest possible kind in cost, and indefinitely. It might be made into large wet docks indefinitely; that was the basis upon which Parliament gave us our Bills in former years. This land principally belongs to Mr. Viner; to numerous individuals; all this is private property. The Corporation has bought the land of the Dock Company, the land from the railway station on this the south side; it all belongs to them along here; and all that to individuals. The Corporation now possesses the whole of the south side from this street to that, and it is free to them to build docks here. On the north side there is a great quantity of private property, but chiefly Liverpool Corporation property. Here it is not so favourable to docks, but there it is very favourable; docks might be made there. There is no limit to the capability of the dock system that might be made in connexion with the great float. There are five miles of shore accessible for any extent of dock accommodation, and the advantage would be that you would have competition in the docks.

J. M. Rendel, 30 May, 1856.

Land of Corporation.

It was at the top of Wallasey Pool that Mr. Telford proposed a fresh entrance to the Mersey; he had an idea, if anything should occur which would still further impair the sea entrance to the Mersey, that by taking advantage of Wallasey Pool, a new entrance might be made from somewhere about Haling Island, round that point a very short distance. There exists inside the sands, between the sands and the shore there, a very deep channel, from which Mr. Telford supposed you might open a fresh entrance to the Mersey; plans were made. I do not know whether after those plans came out the Corporation bought the land. I heard the other day that Haling Island had been bought by the Corporation. That is the deep channel (*witness explained the same*): Mr. Telford had an idea, if anything happened there, that was a way up that might be available. All that is deep water; in fact, it is the best channel by far; the tide originally passed in here; we have evidence of that. The Corporation are at an enormous expense in maintaining this bank here now.

Telford's proposed entrance to the Mersey.

As regards single or double gates to the float, this is a lock, and therefore has double gates; that is a lock, and therefore has double

Gates to float.

J. M. Rendel, 30 May, 1856.

gates; this is a single-gate entrance, but, inasmuch as I was quite certain that any ordinary gate for a 100 feet passage would not be unattended with risk, in designing that work I abandoned the old form of double gates; that is, two leaves or folding-doors. I do not like them; if I had to put a 100 feet entrance I should not put a folding-gate; I should put draw-gates, made upon the same principle as Mr. Stephenson designed his Britannia tube, rolling upon eight locomotive wheels, being ponderous and drawing back, and I so designed that gate that it might be shut in any stream, and it might close both ways, that is, it closed against jambs inwards and outwards, and therefore was to all intents and purposes a tide-gate as well as a gate for enclosing the water; it was an excluding and an including gate; the drawings are all out; I will have them got, that the Committee may see them; one draw-gate; if you had money you might duplicate it, you might put a second with money, but I think in that way you would have a most effectual gate. It would draw in a straight line across, and draw in the wall of the dock; I did that for the purpose of having it in a dock where I could always repair it. It would have power to resist any head of water that it might occasionally have upon it; you might make it of any strength you liked, being in effect a great tube. It would not float; there is a thing of that kind in existence at Keyham, but that does float. A caisson is a very excellent thing where you are not constantly moving it; but where you are constantly moving it I would prefer a gate. Large single gates are very common; there are several at Liverpool. I have one at Leith, and there is one at Bristol, and in numerous cases. There are no gates I know of made more than 80 feet; Mr. Brunel has a pair of 80 feet at Plymouth. The proposed gate is to be 100 feet span, and to be in one piece, and to be drawn into the dock on wheels laterally. I call it the caisson gate. The only single leaf that I know of is at Bristol—I forget the width, Mr. Brunel will tell you—that swings upon its centre; that has one swing on a pivot; but what I propose for this 100 feet gate, after the most mature consideration, with competent manufacturers and others, is to run it back. Each pair of wheels was so made that we could take up the wheels and run it upon six wheels, whilst two were repairing, or even upon four. We calculate that, by hydraulic power, we should open and shut them in five minutes; that is by Armstrong's patent apparatus for opening and shutting gates. That principle of Mr. Armstrong's is now in the most extensive operation at Liverpool for craneage purposes; I first of all introduced it at Grimsby, and now it is of the most universal application. That is the means by which I propose to work the gates; I was told that I was trying an unjustifiable experiment; and many people who thought so are now doing it themselves. Almost all the works of modern engineering are great experiments, sometimes injudiciously, and at other times judiciously applied. Armstrong's apparatus is a modification of the great element of hydraulic power; Bramah's hydraulic press may be considered the origin of all pressure of that sort. I introduced it at Grimsby, and

Draw-gate for float.

Caisson-gate on wheels.

it is now in great use. I apply it at the London Docks, at the East and West India Docks, and the St. Katherine's Docks, and I believe it has been almost universally applied at Liverpool as well. In the City canal, at the Limehouse entrance, they had one pair of gates out, to repair them. They were old gates—the gates which had been originally put in; they had one pair of gates out to renew them, and having some very heavy draughted ships, they shut in a very high spring tide. I think it was a tide that rose 1 foot 10 inches above Trinity high water mark; and the dock master wishing to float those large vessels, shut in that tide, and one pair of gates being left were not sufficiently strong to stand that pressure. I am not the engineer for the old works of the East and West India Docks—I am only the engineer for the new works. The Committee will readily understand why this pair of gates gave way (*describing the same*). The accident was at this pair of gates—this pair being out, the consequence of that was that these new gates—this is a new dock we have just made, communicating between the City canal and the export and import docks in the Blackwall Basin; that is quite a new work, in fact, not quite finished—these gates fortunately happened to be nearly if not quite closed at the time of the accident, and they jammed and mitred, and in seven minutes they had the entire head of tide, which was about 21 feet—they had 21 feet head of water upon them in seven minutes; now, had the gates given way, all those docks would have been emptied; therefore, of course, the Company are very much gratified that these gates stood such an extraordinary pressure. I merely state that to show that single gates, well constructed, will stand a great pressure. A head of 22 feet was upon them, and brought on in seven minutes; the whole was brought upon them in seven minutes. I do not consider a single gate as distinguished from double gates at all an important part of my plan. I shall be perfectly ready to alter and modify that; it is only duplicating. I think it right to the Committee to state, that I should prefer that lock upon the other side; I preferred it, and got it designed when this was done, in order that it might be placed there, but unfortunately this north reserve not being in the hands of the Trustees I could not do it. Now, the Liverpool people have bought that, and I advise them to put the lock upon that side, and put the single gates there; I think it right to the Committee to say that that ought to be done. That would not alter the security, they might still put the double gates; but when counsel says we must look at Mr. Rendel's plan as it is, if I had to design that plan again, I would put the 100 feet lock upon the north side, and I am not quite sure that I should not make it 120 feet instead of 100, having an opportunity of getting land there now. Mr. Hartley proposes to put a lock between the float and the Egerton Dock; I see no reason for that but what I think would be unjustifiable to the interests already existing upon the Egerton and Morpeth Docks. If it is intended presently or prospectively to make the Morpeth and Egerton Dock the great entrance into the float, then I can understand

J. M. Rendel, 30 May, 1856.

Accident at the West India Docks.

Lock to be removed to north side of basin.

J. M. Rendel, 30 May, 1856. Sacrifice and cost of executed works.

Mr. Hartley's taking down what has cost about 90,000*l.* and putting this lock in there. He would take down the whole of this passage now in existence; he would destroy this lock and would substitute for that his lock. Now I can understand if this, the Morpeth and the Egerton Dock, is to be the great passage into the float, that would be a mode of doing it; but my idea is, that this ought not to be the passage into the float, except under very exceptional cases. I am of course assuming that a main entrance upon some plan or other is to be made; if that is to be an efficient entrance into this float, this will not be wanted for the float except very partially; and besides which, if used extensively, would enormously interfere with all the traffic now existing, and which is so important to the railway interests, and prevent it from being carried on profitably or beneficially. If these works were not carried out, and if this was to be the great entrance into the float, I can understand it; and I can understand how parties very much interested in the property here might almost as soon have that arrangement as the main entrance, but I cannot understand that as a great principle which a trust ought to carry out, that is, a question of 150,000*l.* I said that the proposed lock of Mr. Hartley's, to be constructed at the Egerton Dock, was not justifiable except with reference to interests that were public interests; the cost of that alteration would be the sacrifice of the Egerton Dock in a great measure, and at the direct sacrifice of about 80,000*l.* to 90,000*l.* already expended, and 60,000*l.*, the proposed cost of the work; that is at a cost of 140,000*l.*, because it is not a question of safety at all. Here there is a caisson. I made provision for another caisson, and, as far as safety is concerned, I would rather trust to caissons than gates. My improved gate is a combination of the two—a caisson and a gate; provision is made in that work for caissons, and you have nothing more to do than to place two caissons there, and you effectually protect that passage, much more than a lock would do it; and render profitable the expenditure already incurred.

Deep sills must be at a distance from the Mersey.

I told the Committee that deep sills are essential, if the trade of the Mersey is to be adequately accommodated, and also that, in my opinion, a sheltered entrance basin of that kind is essential to deep sills. The distance, or the position of those sills from the Mersey, is most essential to those conditions. It would take very much greater expenditure of water, in the form of sluicing power, to maintain deep sills, if they are not far recessed from the stream of the river, and for the reason that most of the witnesses here, including Mr. Hartley, have very properly placed before the Committee, namely, that the longer your basin is from the strength of the tide, the finer will be the character of the tidal deposit left at its head; the coarse deposit, or the heavier deposit, will be at its mouth, which is the case that we find in all positions in the Mersey. I do not know a single exception. The maintenance of this low-water basin, at the depth which I have mentioned, was a matter to which my attention, and the attention of other engineers, was directed

from the first, in 1844. My views upon that point have not changed at all. I believe, if we properly applied that enormous power which we have in the float, and for which the float was originally intended, we shall be able to maintain that basin of 27 acres at the depth which I have stated, or deeper, that is, 12 feet below low water of spring tides; I believe that we shall be able—and I am now speaking with some experience in the deepening and improvement of rivers—I believe, with the current which we shall be able to bring from those sluices, that we shall be able to deepen the basin across here considerably beyond 12 feet; and for this reason, the Mersey stream runs so close to the entrance of the basin, and so powerfully, and has so perfectly scoured away all its bottom, down to the hard red clay and the rock along that shore, that the stream which we shall be able to bring through the basin will not only clear the basin, but run off in the last hour of the ebb, and will be so much the master of the stream of the Mersey then running, that we shall send the whole of that stuff out into deep water. Mr. Hartley stated that the deposits changed in character as you receded from the Mersey; Mr. Hartley gave very correct evidence upon that. That fact was one of the considerations upon which I founded the plan in 1844. I then drew up a memorandum, and it was used again in Committee in 1852, and it put the whole question fairly. I think it is this: that, inasmuch as the power of water to suspend anything heavier than itself must manifestly be governed by the velocity with which it runs, we should find in any sheltered basin of this kind that the entering water carrying in matter would carry it no further than it had the power of suspending it; and therefore, inasmuch as the velocity is almost uniformly diminished by the expansion of the basin as you pass from the entrance to its head, so you would have a deposit of the heavy particles in the entrance of the basin, gradually diminishing as you approach the upper part of the basin, by the flood as it comes in. Another thing we must remember is, that it always happens that the greatest deposits are made when there is most sea at the bar, and that generally brings us in the highest tides, so that we have most scouring water when those deposits are the greatest. The entering-water can only carry the deposit to the extent of its power or velocity. The matter which water carries in suspension must be heavier than the water which carries it; then, as you reduce it from a state of motion to a state of rest, so it deposits. Taking the deposit which would be found in that basin, the coarser would be found at the entrance, and it would diminish and gradually become finer throughout. The evidence of Mr. Hartley as to what takes place in the Liverpool Dock confirms my view. I heard Captain Hookey's evidence as to what took place in the Morpeth Dock; no doubt there is some coal-dust among that. In addition to the experience of Liverpool, as stated by the evidence of Mr. Hartley, the experience of Birkenhead, both as to the Morpeth Dock and the Woodside Basin, confirms that view,

J. M. Rendel, 30 May, 1856.

Power sufficient to maintain the low-water basin.

Relative position of different kinds of deposit.

J. M. Rendel, 30 May, 1856.

I think, more strongly than on the Liverpool side, because it is more sheltered.

Deposit in Woodside Basin.

The character of the deposit in the Woodside Basin varies—it carries the sand along the margin of low-water and for some way in, and then it gradually passes off into this description of silt, and at the head of the basin the rocks are now, I think, as bare as when we made it; but that is the most unfavourable example of the operation of silting possible. In the first place, this pier entirely shelters it; in the next place, this part where the accumulations have taken place is quite out of the line of any sluices; you cannot get the sluices to act upon it, or at least they do not do so. Again, vessels lie aground here, and discharge over the side, and I have no doubt there is a much greater quantity of deposit from that cause by stuff from the vessels, but it is not a parallel case at all to the low-water basin. And here it is very odd that the power we have in this culvert keeps open, I believe, the best entrance to any dock in the Mersey. That drains all the land-water from the marshes, and if there is any cementitious matter, it would operate there, and it is also the great sewer of Birkenhead. The head of water is not very great from that source. It does not bring any water from the great float; there is no great quantity brought down from the land. There is no effective system of sluicing except they shut the high tide into it, but they have no right to do that. I think it is very likely they shut the high tide in. I do not know whether they do that. If they do not do that, the power of the water derived from the drainage of that district would be very inconsiderable; although there I made a culvert 10 feet in diameter, still the land drainage water from that district is not large.

Deposit from indraught and trapping of waves.

I have explained that the deposit in that low-water basin must be that which is due to the indraught on filling. In addition to that there is a deposit in basins by the waves being trapped; but that Woodside Basin is, from its great width of entrance and want of depth east and west, a most favourable place as regards such deposit; and, as I said before, it is an outlet for the sewer; it takes the greater part of the sewage of Birkenhead, and it is also a very favourable place for deposit. The two causes of deposit, the indraught and the waves that are trapped and become still, will not operate much in the low-water basin; supposing the flood tide to be rising an inch a minute, as it often does, the greatest indraught at the mouth would be about the fifth of a mile an hour, assuming that the gates to the float are not open. The flood tide has to fill the basin up to 13 feet above the Old Dock sill. Supposing the tide to rise to 5 or 6 feet an hour, the indraught, to fill that 27 acres basin, and to keep it to the same level as the river, would be about the fifth of a mile an hour.

Lift of tide in successive hours.

A tide rising 28 feet, rises 9 inches in the first hour, 6 feet 3 inches in the second hour, 7 feet 9 in the third hour, 6 feet 9 in the fourth hour, 4 feet 8 in the fifth hour, and 1 foot 9 in the sixth hour—you may take that as the mean in the river generally. Supposing the low water to be 8 feet 9 below the Old Dock sill, the rise of that tide would be

about 19 feet 2 upon the Old Dock sill. That being the rate of the rise or the lift of the tide in the Mersey, such a tide would have risen to 13 feet upon the Old Dock sill at three hours and three-quarters' flood, and then all the gates would be open if the tide rose above that level. At spring tides, or at a tide that rose 27 feet 11, the gate would be open during about two hours and a quarter before high water. During all that time before high water, amounting to two and a quarter hours, vessels could enter the great float—that is the intention; they could sail in—any ordinary-sized vessel; if the wind was fair she could sail, and if it was foul she could be tugged in without stopping at all. I have said that before the gates are opened, and the tide has risen to 13 feet, the indraught into the basin would be about one-fifth of a mile an hour, carrying in a very small deposit. The indraught into the basin after the gates are open would be something under a mile an hour: it would be a help rather than the contrary. According to the plan of gates which I think best for that entrance, you might leave it open under ordinary circumstances for half an hour, but I should say you might reasonably calculate that the time when you would be able to pass on a level would be in the mean of tides, rising about 13 feet, from two and a half hours to three hours, which would be an enormous advantage. On ordinary tides you might take it to be two and a quarter hours before and three-quarters of an hour after high water; that would be an enormous advantage. We find in all docks having a great traffic that the operation of locking is a most tedious and troublesome one; take the case of the north dock at Hartlepool: they had a lock in the old harbour, and they used to lock under the idea that by not changing the water so often, that is, by only using one pair of gates, they would have less to dredge, but the trade grew upon them so that they could not afford time for locking, and now they work their lock down to the tide of the day with one pair of gates, and the result, according to all the information I can get, is, that they were quite mistaken; they do not think that they have any perceptible increase of deposit. Then at West Hartlepool the same; they use the tide of the day, and they run in upon the level; in fact, in these coal ports they could not carry on the trade through a lock. It is the same at Southampton; but at Southampton they have a great low-water basin, and, notwithstanding what our friends say on the opposite side, it is a basin into which they sail sometimes 1000-ton ships under canvas. At Hartlepool, where it is found essential or convenient to the trade to work a lock with the gates open to the tide of the day, the amount of the deposit has not been sensibly increased; I am told so; I am the engineer for the new harbour there, and those inquiries came before me, they were made for me professionally; and I may venture, I think, to say that there is no sensible increase of deposit at Hartlepool. There is a considerable amount of deposit, of course, from the coal-dust that gets into the dock; but as far as the marine deposits are concerned, I am told there is no sensible difference. The accumulation at Hartlepool is not, I think, from

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Indraught when gates open.

Objections to locking.

Deposit from working to the tide of the day.

J. M. Rendel, 30 May, 1856.

the silt brought in. There must be some deposit from the water, but I believe in most docks it is chiefly arising from things being thrown over the quays, and from the ashes of the vessels, and all sorts of nuisances of that kind thrown in; in coal docks, I believe that is principally so. At those times when this communication would be free from the river, the amount of deposit carried by the water is least; the time, of course, when you are least liable to deposit passing into the docks would be after the tide has risen considerably over the sand-banks at the entrance of the river, because I do not agree with Mr. Hawksley that the chief proportion of the silt carried by the Mersey stream is due to upland waters; in fact, it is contrary to all experience, and, as the tide has flowed over all the sand-banks at the mouth of the Mersey when the water would be entering through those gates, I do not think that the tide would carry any very large quantity of matter in the flood. In the Mersey the great amount of sand is carried in the first flood; with a westerly wind breaking over those sand-banks at the mouth of the river, the water takes up a great quantity of the finer sand, and the flood tide brings it in. When those banks are all covered, there is no break, of course, and the water comes in less charged with sand. During the early part of the flood, up to the time when the passages are open, there would be an indraught to the tidal basin at the mouth of one-fifth of a mile an hour; that is a very small velocity indeed; that velocity, small as it is, will be diminished as the section of the basin increases. You do not find that the dirty water passes into the basin; you may almost see the strip separating it; the master stream seems to carry the sand and matter past the opening, although there may be a slight current into it. I have watched it over and over again at Weymouth and Portsmouth. We can scour when there is no more velocity than the fifth of a mile an hour, and that velocity diminishing every step you advance with the increase of area of the low-water basin; that will diminish the deposit at the upper part of the low-water basin. On a falling tide, there will be an outset current of the same kind; the basin must be emptied; the basin will empty as fast as the tide ebbs out of the river. I heard Mr. Hawksley say there would be a deposit on the outset tide as well as on the inset; but I almost fancied that I must have mistaken him, because I cannot understand how a man can express an opinion that a deposit can take place when water is running out of a basin; I thought I must have been mistaken. On the emptying of the basin there would be a velocity through the mouth precisely the same as on the filling. You would have the same velocity at passing out, because as the tide ebbs out of the Mersey the tide will ebb out of the basin, and therefore the outgoing stream will, as a matter of course, tend to obstruct the sand rather than to let it in. Assuming that the gates are open, and the float is filling, and that the Morpeth Dock gates are not open, but that the float is filling through the low-water basin only, the greatest velocity will be under a mile an hour with an extreme tide; assuming those

Sand taken up at first flood.

tide-gates shut, and all the sluices and other gates open to fill the float upon a spring tide, the velocity at that time will be from half a mile to something like seven-eighths of a mile an hour at the gates. The water will enter also through the sluices; I have not explained the sluices yet; the greatest velocity that can take place as an indraught through the low-water basin will be under a mile an hour; immediately the water gets into that wide part of the float it almost loses its velocity. On the Birkenhead side I do not find much sand. If there are projections of this kind running off, you find some sand near them. Now, for instance, at Seacombe there is a considerable projection acting as a groin, and you have, consequently, a deposit of sand, but under favourable circumstances. You scarcely find sand more than 200 or 300 feet from the line of low water. Respecting the solidification of the deposits in that part of the Mersey, I have always found it takes several years to solidify sufficiently to enable a person to walk upon it. The deposit of the Woodside Basin, for several years, was very silty indeed. I dare say the deposit in the Woodside Basin may be as much as 6 feet; that basin has been. open ten years; that would be under the hundredth of an inch upon a tide; and all that is so perfectly fluid when it is first deposited, that if you stick up a willow in the basin, it will not deposit upon the eddy side of the stream, it is all perfectly semi-fluid. This theory of solidification is quite inconsistent with my experience; unless you allow it to remain for years undisturbed, then it will necessarily solidify. It would not solidify in a single tide to a sufficient hardness to prevent its being swept away by the sluices; on the contrary, I do not believe it would be more than just floating upon the bottom, its specific gravity is so little more than water when first deposited, and therefore it is so easily disturbed. If Mr. Hawksley's opinion was right, the Ouse ought not to flow, and both the Nene and the Welland ought not to flow in a bed; none of those flat rivers ought to flow in a bed. To give you some idea—and really it is a matter that I am sure everybody would wish to be right upon—I am deepening the Nene; I find that with a velocity in the Nene of something under three miles an hour, we have only to dredge away the hard shoals that go across the bed, and the stream then does the rest of the work for us. My actual experience of the deposit in the Woodside Basin and of silting in the lowest part of Wallasey Pool, such as I found it in the borings and excavations that I made there, confirms my opinion; and it also shows that there is a great exaggeration about the amount of silting; excepting under circumstances very favourable to silting. We found in excavating the float somewhere here a canoe, that is, it was a boat dug out of a trunk of a tree, and it was about, I think, 10 or 12 feet below the surface in the soft mud; that was at Birkenhead; it must have been there an enormous time, for I rather wanted to save it; but it went all to shreds by an exposure to twenty-four hours' sun. We found that in the portion which had been excavated at Birkenhead, 10 or 12 feet under

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Maximum indraught to float.

Deposit per tide in Woodside Basin.

Silting in Wallasey Pool.

J. M. Rendel, 30 May, 1856.

sand, mud, and silt. It was 25 feet long, formed from a tree, the upper part of the tree forming a bow, and a part put in for the stern of the boat out of the stump of the tree. I should think it would hardly decay and go to pieces as it did by exposure to the sun and air, unless it had been there something like 1000 years. The experience I have of the excavations in Wallasey Pool, and the character of the silt there, confirms what I have already said as to the deposit in the Woodside Basin. The Woodside Basin is dry at low water; assuming a deposit of about the hundredth of an inch a tide in the Woodside Basin, that takes place under the effect of sun and wind. The deposit in the low-water basin would be under different circumstances; every time you drain off the water by the tide ebbing upon the surface, it tends to a certain extent to solidify that which has been deposited. The low-water basin is not under similar circumstances; the matter would be always kept in suspension. The evidence of Captain Hookey as to the Morpeth Dock and the Egerton Dock confirms the same view. There is some important evidence in connexion with this subject given by Mr. Hartley with reference to the silting and the deposits in the Liverpool Docks. The silting and mud question was a subject of inquiry before a Parliamentary Committee. It was a very important question, and I wish we could get more of these papers from the public bodies. This is a paper signed by Mr. Hartley, Sen^{r}., engineer of the Liverpool Docks, dated the 2nd of March, 1844. It was on the subject of casting the matter dredged from the docks into the tide-way of the river; Mr. Hartley considering it did no harm, some people considering it did. Mr. Hartley, Sen^{r}., says: "Since the preceding observations were written, the report of Captain Evans, the acting conservator of the Mersey, has been placed in my hands, and I have greatly to regret that he did not communicate in any way with me on the subject previous to its production, as he seems to labour under wrong impressions, and has not been furnished with correct data on which to found his reasons. It may consequently be proper that I should offer a few observations thereon. Captain Evans acknowledges that the navigation of the Mersey is at present in a satisfactory state, and that 33,694 vessels have passed through the different channels from Liverpool to the sea during the past year with the loss of only six, and those of small class; and after describing the efficiency of the Life Boat Establishment and the Pilotage, he informs the Lords Conservators that the banks of Liverpool Bay extend over an area of nearly 80 square miles"—that is, the sand-banks at the mouth of the Mersey. I do not wonder, therefore, that they are rather nervous about the interference with the "sea channels." He enumerates the different channels, and states—"that there is 12 feet water over the bar of the Victoria Channel at low-water spring tides, and that not a single vessel has been lost in it during the four years that it has been opened, although 20,000 pass through it annually;" a conclusive proof, as he says, that its buoys and lights are well attended to; and I

Mr. Hartley, Sen^{r}., as to silting.

think he might have added, that no bad effects are experienced from the depositing of the docks' mud in the river. He next states "that no material change appears to have taken place in the channels and banks of Liverpool Bay during the past year, except the extension of the bar of the Victoria Channel to seaward. This I have before shown is a natural consequence; but I think it proves anything rather than the deposit of the dock mud in the river is prejudicial. Taking Captain Evans's own figures of 213,000 tons, it consequently appears that about 360 tons of fluid mud and sand are thrown each tide into the river, only a part of which he supposes to be distributed by the ebb-tide over the 80 square miles of banks in Liverpool Bay. This mud and sand, it must be borne in mind, originate with the river itself; and were the docks to remain closed or supplied with water from another source, the same mud and sand would still be held suspended in the waters of the Mersey, and would produce the same effect as at present. As 360 tons are daily taken from the docks, the same quantity must daily be deposited therein; so that it will on reflection be perceived that we are in the habit of only returning each day the quantity of mud and sand received into the docks, and that no worse effects can be produced on the navigation than would be the case if no docks existed. Such has been the practice since Liverpool possessed docks, and instead of the navigation deteriorating, it still remains satisfactory, though since 1825 the area of the dock space has been doubled, and of course the mud and sand taken therefrom likewise doubled. The class of vessels is of a much larger description, requiring greater depth of water, and yet the losses are fewer each year, and the Victoria Channel retains its depth undiminished." That which Mr. Hawksley called cementitious matter this year, Mr. Hartley, in 1844 in that report, called fluid mud; those 360 tons which are deposited daily over the 113 acres of Liverpool Docks, and returned each day, are about 3¼ tons per acre. Assuming that we had the same amount of deposit at Birkenhead as at Liverpool, the quantity deposited in the low-water basin would be 88 tons over the whole basin per tide. I do not believe that we shall have the same amount of deposit at Birkenhead as at Liverpool; I do not believe any of us think we shall; and I do not think there is any difference of opinion upon that. The thickness of that mud would not be more than that of writing paper, about the thousandth of an inch; I do not think it would be deposited at all, being fluid. For removing this matter, we have in the main fork altogether, including the culverts and the piers, 556 feet of area in the sluices; in the Birkenhead Fork 475; the total therefore is 1031; the sluices are situate quite at the head. The Committee will see the model, as far as these are concerned; and the others are quite at the head of the basin, and round the pier-head of the great lock; they discharge, like Mr. Hartley's, from the pier-head. They will be worked by hydraulic machinery, the same kind as that with which we propose to work the gates. To give an idea of the quantity of water available

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Mud from Liverpool Docks.

Quantity and character of deposit.

J. M. Rendel, 30 May, 1856.

for discharge, I have had this diagram prepared, which relates to the observed tides of the years 1840, 1841, 1842, and 1843; because they are observed, not merely predicted or calculated tides; they are the absolute tides. There are three consecutive days in July when we should have no sluicing water; and in August we should have five; 22 feet would be the maximum—what one might term a dose of physic to the basin—one would not wish to repeat it. The plan would be to use it day and night, if wanted, but I do not believe it would be. I have also calculated the united columns for every day of this year, so as to see what was the entire gross column. We have, in the year, a gross sluicing power that comes to very nearly 2000 feet in a year over 150 acres, 1950 feet, that would be the entire tidal column run down from the float during the year. It would represent a lake of about 150 acres, 2000 feet in depth. According to the observed tides of those four years, out of the 730 tides we should have sluicing water for 527 tides; according to the observed tides there would be 527 tides when there would be sluicing water. That is for one year; but that is a very fair average of the whole. In one year, 1923 feet would be the total tidal column run off from the basin in the year—that is, in the year 1840; and in the other years that I have tested it does not vary 30 feet. I have therefore taken that as the mean 1950, which would be about the quantity due to all the tides of the year available for scouring; 1950 feet over the 150 acres would give 12,417 million cubic feet. I have compared the area which that quantity of water for sluicing would represent with the drainage area of the Mersey; this plan represents the whole land drainage into the Mersey above the Weaver navigation, inclusive of the river Weaver; this is the Weaver; that is the Mersey proper; this is the Swilley; and this is the Glazebrook; and that is the Sankey. The united drainage areas are 1334 square miles; this represents an equivalent of tidal water from Wallasey Pool equal to 300 square miles of drainage area. Therefore Mr. Hartley's plan is virtually depriving the Mersey of that quantity of drainage water, run off at about the time of low water, when its value to the sea channels is so great. If this quantity be not run off at low water, so much less water will pass through the sea channels. My plan does not, in fact, deprive the Mersey of the water. Sir William Cubitt gave it as his opinion, before the Lords in 1844, that that quantity of water run off at a time when it ought to be run off for scouring the river would more than compensate for the alteration proposed to be then made by the enclosure of Wallasey Pool. That opinion was concurred in by the other engineers. This water is of greater significance in value than any drainage, because this is the drainage run off at a time of the tide when its effects upon the channels of the Mersey must be much more than this drainage. It is equivalent to adding that to the natural drainage, and it is making it available at that time of the tide when its power to do good is so much greater. If you do not run it off through the sluices, you lose the

Quantity of water for sluicing.

Comparison with drainage area of the Mersey.

Value of water at latter period of tide.

advantage of adding 300 square miles to the drainage area of the Mersey; and you add that by my plan, and at the time that I consider it the most effectual; and we fulfil the obligations imposed upon us by Parliament, when the Corporation of Liverpool raised as the most formidable part of their opposition to our scheme, that we were abstracting that portion of the tidal water from the Mersey. When we calculate the velocity due from the sluices, we must calculate that velocity as due from the particular tides; but when we calculate their capacity, we speak of them as a reservoir capable of collecting that water in the course of a year. I regard this water returned during 527 tides out of 730 in the year as valuable to the sea channels of the Mersey, in addition to its time of use. There is a very material point to be considered in reference to the sea channels. It will be observed that we have the greatest quantity to be delivered into the Mersey about the time of low-water spring tides, when, as a matter of course, it does the greatest amount of good, the channels of the Mersey being then at their minimum section. It is at that time of tide when the channels are defined by the drying of the banks; it is at that time of tide when, from the banks being dry, water for scouring has the most effect upon them, because the banks are dry and the channels better defined. The water so returned is equivalent to a river which might be represented by one-fourth of the drainage area of the Mersey very nearly. That quantity of water would be abstracted by Mr. Hartley's plan if he did not run down the float to meet the tide, as proposed by the authorised plan. The abstraction of the water by means of the works was the great objection of the Liverpool Corporation. It was notorious that the Liverpool Corporation had, and I believe wisely, spent thousands and thousands of pounds in protecting the river from encroachment, and I think in the majority of cases wisely. The velocity of the discharge in the middle of the Birkenhead Fork, with a 20-feet tide, would be 6 feet per second, which you may take at 4 miles an hour; at the north end of the Birkenhead Fork it would be 3 miles an hour, or 4·5 feet per second. In the main fork, across here—that is, the east end—it would be 3·5 feet per second, or 2½ miles an hour; at the junction, immediately below the junction of the two forks, it will be 6·9 feet per second, or 4¾ miles an hour; at the entrance to the basin it would be 8·8 feet per second, or 6 miles an hour; this velocity refers to a 20 feet tide, with 33 feet velocity at the sluice; 20 and 21 feet are extreme tides. The velocity of the tide in the Mersey during the last hour of ebb off here would not be more than a mile an hour—a mean velocity of a mile and a half at the extreme. The velocities at the same points in the basin, for an 18 feet 3 tide, would be respectively 3·15 feet per second, or 2⅛ miles per hour; 4 feet per second, or 2¾ miles an hour; 3·1 feet per second, or 2⅛ miles an hour; 6·1 feet per second, or 4⅛ miles an hour; 7·9 per second, or 5⅛ miles an hour. Then upon the mean of the tides, or a 16 feet 4 tide, which is the great bulk of the time

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Opposition on the ground of abstraction of water.

Water most valuable when channels are defined.

Opposition of Corporation to encroachment.

Velocity of discharge.

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when we should have sluicing water, we should have at the same spot respectively 3·2 or 2⅛ miles an hour; 3·5 or 2⅛ miles an hour; 2·75, or 1¾ miles an hour. With a 20 feet tide, ordinary springs, as they are called, and the mean of all tides, we should have a river running out of this basin, varying according to those tides, 6 miles, and 5⅛ miles an hour, if you chose; but I contend that it would be very injudicious to run it off so fast as that. I believe a very much less velocity would do more work than you have got to do there. I know the Thames is doing as much, and it is not running more than 2⅛ miles an hour. That would be the mean velocity of the mass of the water passing out of that basin; in fact, it is very nearly what Mr. Hawksley says himself; there is very little difference between me and Mr. Hawksley upon this point. There would be the opportunity, by means of the sluices, of passing the whole of that water through one fork, or through both, according to circumstances. The reason for a double passage between the Egerton Dock and the float was that I might not have a very great velocity passing through there. I made it a double passage, a 50 and a 70 feet passage, for the purpose of being able to concentrate the sluicing in this fork if I chose; that would have the effect of doubling the time—we should be running down the sluices. It would not alter the calculation of velocity; we should be more time about it. This being the section of the low-water basin, these the walls, that the bottom, this the depth of the water running—the velocities I have given are calculated upon the centre of that section. I have given the mean head for determining the velocity from those sluices; I have taken those two tides, 18 feet 3 and that of 13 feet: I have taken the mean between those; if the same velocities would continue during the whole period of sluicing. Taking the extreme of the indraught as three-fourths of a mile, you have the proportion between three-fourths of a mile indraught and six miles out-current; that would be nearly 7 to 1. That proportion could be modified according to circumstances: those sluices would be so arranged that we might open them suddenly; that is, in a very short time, or we could open them partially. The excess of the outgoing velocity over the indraught would afford the means of removing any accumulation that might take place between the intervals when you would have no sluicing. I should begin sluicing as soon after the commencement of the last hour of ebb as all the peculiar circumstances of the case might from time to time make desirable; but it would certainly be in the last hour of ebb. At that time the stream in the Mersey is not more than a mile an hour. The outgoing stream would have such a velocity that it would master the stream of the Mersey. The depth of the Mersey off the proposed entrance is very favourable for the purpose. This section represents the bed of the Mersey between Seacombe Point and Woodside, this being the section directly opposite to the low-water basin; that is the centre, and there is the entrance; that piece, of course, would have to be removed. This is the existing state of the

Velocity from the sluices.

Relation of indraught and outdraught.

Time of sluicing.

Sections of bed of Mersey.

bed. This is a plan showing where the sections are taken; there is No. 1 section, which is this: this is literally where the Mersey has scoured out its bed down to that—it is quite a basin; it shallows very rapidly above and below Liverpool. It is sluiced out; and any serious diminution in the tidal water in the basin of the Mersey would be a most serious injury to what is called the neck of the bottle. I do not mean that the stream has cut down the sandstone; but it has taken away all the clay from it. The depth is 72 feet below the Old Dock sill in many places; that is the section; it may well be called the neck of the bottle, it is really so. The depth from there to there is 24 feet below the Old Dock sill. That stream would rush out, and the particular advantage of that is this, that you have a tide sweeping above here at half tide of five or six miles an hour, so that any deposit brought out even by our sluices in neap tides, if lodged there for a short time, would be swept away immediately. It would go immediately out into deep water. We should dredge out, in this direction and that direction; now the rock only just comes here, it dips away again in both directions, and we have got some striking facts about that; we have proved that such has been the scour through this entrance to the Mersey at some remote period that the rock has got no clay upon it at the bottom; it is polished; there is a very small bit of rock there, then it dips away very rapidly, and shows just again here; it dips away rapidly here, and there it remains; the old channel seems to have been here. Immediately here we lose this piece of rock; here the rock is deep; we take up on this side of the low-water basin that section; the scour has not been able to remove that hard piece of clay which overlays the rock here, but there the clay is gone; those were the sections made for the House of Lords in 1844; there is no change in these. Having reference to the section and form of the channel of the Mersey, this outgoing stream, of the velocity described, will carry any deposit there may be quite into the bed of the Mersey; it will carry it sufficiently far by the neap tides to be swept away by the spring tides. A stream going out with a velocity of four miles an hour will hold its way on into the stream of the Mersey. I should think 200 or 300 yards, according to the spring or neap tides. I think you will find that at the time of tide when we should run this water out, you would have an outward stream from that basin into the ebb stream of the Mersey fully from 200 to 300 yards from the wall. The time that velocity would last would very much depend upon circumstances; it would last from 20 minutes up to three-quarters of an hour; during that time the ships could not come in very well. But you could modify it; I am perfectly certain there is no occasion for that great velocity there; we have nothing but the sand and the silt; it would be using power without an object, except at neap tides, when you want to bring a considerable power, because you have not so much time for the application of that power. I do not think it would be found necessary to do it, except

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Deep water opposite the low-water basin.

Deposit carried into the main stream.

Extreme velocity unnecessary.

J. M. Rendel, 30 May, 1856.

occasionally. The outgoing current into the Mersey, I presume, would meet the stream of the Mersey on a curve which would be modified by a variety of circumstances, the effect of the wind, the direction of the wave, and other circumstances; but I mean that you would have an outward stream from the mouth of the basin running, so as to suspend any matter that it would have to carry, for 200 or 300 yards at spring tides. You may represent it as analogous to a small mountain torrent running into a large river. My general impression is, that at all events it would sweep it out far enough to be carried away by the greater current of the river. We see by those sections that there is a depth of between 20 and 24 feet at 150 yards from the mouth of this basin. Now I am perfectly satisfied that at that distance you will have on the flood and the ebb tides, when running hottest in the Mersey, a stream that would carry away all that mud and sand that might have been deposited there from the low-water basin. I think Mr. Hawksley put the matter about sluicing into dead water before the Committee in a right way; there was an idea that because you run into dead water therefore you did not put the whole mass in motion—that is wrong. I cannot illustrate it better than Mr. Hawksley did. The water in the basin has a certain outgoing velocity at the falling tide; therefore it is not the case of water pent up in a lock. Mr. Hartley proposes what I think he will find some difficulty in doing. Mr. Hartley proposes sluicing in this direction, from this wall, and in that direction, and, in fact, sluicing by cross sluices and by different sluices at the same time. I do not think that would be very effectual as regards the issuing stream; besides, calculating Mr. Hartley's sluices by the same formula as Mr. Hawksley gave us, and the same formula as I have used here for the calculation, and giving him credit for all that, I find Mr. Hartley says this: his sluices will discharge 15,086 cubic feet per second. Now taking his basin at 19 feet deep and 400 feet wide at the mouth, he will have, with a spring tide of 18 feet, a velocity of two miles and two-thirds of a mile per hour at that point where I get five miles and two-thirds of a mile. The cross sluices will, I think, be found objectionable; it is found that cross sluicing is not so effectual as might be expected; it does not throw up banks, but very often it does not take those which exist away. At the mouth of that basin I want to get the effect of a great river in moderate velocity, that is what I want to get; and that velocity distributed over the whole section of the channel between the walls; that is not so clear to me, upon Mr. Hartley's plan, the sluices being so near upon the river wall. I think Mr. Hartley's dummy a very bad substitute for the freedom with which steamers would enter and act on the deposit by my plan. The free access of those steam vessels to that basin is another element in assisting its maintenance; as to that I speak from experience; for instance, at Hartlepool we are deeper when vessels are crowding it, and it becomes shallower as soon as they leave it. I take King's Lynn as one instance, and the reason is obvious—the section of

Objections to Mr. Hartley's sluicing.

Effect of steamers on deposit.

the bed of the river is reduced in proportion to the obstruction caused by the vessels. The experience of the Thames and the Clyde confirm that opinion. The Thames is a very striking case, and the Clyde is even a more striking case. The Clyde is the most striking case on record how a river may be maintained by care with a great number of steamboats passing through it. Assuming that this low-water basin should become a place for steam trade, as was anticipated, that will assist in its maintenance, and its size will assist in its maintenance. The larger the basin is, the more undulation there will be in the surface of the water; and the more undulation, the less will be the tendency of the finer particles of mud to deposit. No doubt steamers are the most successful agitators. I believe the greatest cause of change in the Thames has been the removal of old London Bridge, and that has clearly shown what a river with a comparatively small velocity will do with its bed if you do not coerce it. The westerly winds occasionally work out the silt and deposit, particularly upon the ebb tide. The wave and tide acting together, would occasion a greater agitation in the basin. I do not mean a wave that would interfere with the convenience of vessels, but I mean a sort of agitation which is quite sufficient to keep light matters carried by the water in suspension. Neither of those causes could be operative in Mr. Hartley's basin. If the cementation theory of Mr. Hawksley were founded on fact, the Thames would be a great place for its operation. It is wonderful what a small power will keep in suspension vegetable matter particularly. There is not the smallest analogy between the other instances of sluicing referred to, Hartlepool and others, and the system I propose, except that in those the sluicing is effected by water retained in the basin, and run out at low water; as regards the way in which the water is to be used, or the quantity, there is not the smallest analogy. I have the particulars of Hartlepool here. I am very intimately acquainted with Hartlepool; this is a plan of Hartlepool. This is what they call their Slake, which has an average of 3 feet deep about. This is the harbour of Hartlepool, and this is the Old Dock; these are the docks there. Now the sluices are in those embankments, and the form of them will be better understood by this plan; that is the plan of the sluices (*producing the same*); that is the section; they are small, considerably above low water, and discharge over a long apron in the old way of sluices; and then they discharge through this unwalled harbour here with sand banks on either side, and then they discharge into the open sea, to remove a bar here, which is at a distance of very nearly a mile off this, into the open sea and shoaled water. The bar is frequently reduced as much as four feet in a series of sluicings, but the marvel is that these sluices do so much. I have here a section that has been prepared of what those sluices do in various years; this is the sea end; these are the sluices; this is low water, and those are the various states of the tide. The dotted black line denotes the bottom as executed or excavated, that

J. M. Rendel, 30 May, 1856.

Lighter matters would be kept in suspension.

Sluicing at Hartlepool.

J. M. Rendel, 30 May, 1856.

is, as made originally; the red line dotted, as found by Captain Slater; the tinted black line, as found by Mr. Murray; the tinted red line, according to the Admiralty chart made by Captain Slater; the yellow, as found by Mr. Murray in 1852. They had ceased the sluices for a long time, and between the period when they ceased the sluices and 1852, when Mr. Murray took this section, he found it had increased so much —of course you will understand this is a grossly exaggerated scale— the vertical scale is here very large, in proportion to the longitudinal; but it only shows that sluices applied in this very insufficient way are able to maintain the channel under the most adverse circumstances—a sea channel, for instance, at the bar—you observe what was the change in the bar by not sluicing in these years, 1838, 1843, 1847, and 1852. That does not bear upon this subject at all; it is not referred to as a failure. I say, as far as it has gone, it has been anything but a failure.

At Cardiff and the London Docks.

Cardiff may be referred to in the same way; but in the London Docks I cannot say it is a failure. I should refer to the London Docks in support of the views I have entertained as to the effectiveness of sluicing if properly applied. Even there, with occasionally the help of harrowing, we get a channel from our lock entrance out into the deep channel of the Thames of from 10 to 12 feet. We mean to improve the process of sluicing in future in the London Docks; but those are not parallel cases. As the honourable member said, they are exceptional cases; they only prove what you may do by sluicing if you will do it well.

Deposit in docks just within the gates.

We find in all docks the greatest accumulation to be just within the gates where the indraught current loses its velocity; there we find, without exception, as far as my knowledge goes, that that is the case. In the case of the float it will be so near the sluices, that I have no doubt at all but that all that is so deposited will be carried out by the sluices. I do not say that with reference to the upper part of the float. The increase of the section immediately that you enter the float, will lead to such a diminution of velocity, that any heavy matter, any sand brought in, will be deposited very near to the sluices. All the heavier deposits brought in by indraught through these entrances and through the openings of sluices, will be deposited, I believe, in about that space; and looking at the enormous discharge of those sluices, we must anticipate a bottom velocity in the water passing off, and that bottom velocity will disturb and remove a large portion of that deposit. The sluices are all below the bottom of the great float from this point; the bottom of the great float from here was, under the contract with Mr. Brassey, to be 12 feet below the Old Dock sill; here it was intended to be 8 and 10. The deposit of the upper part of the float from other causes will be common to all plans.

Heavier deposit within the range of the sluices.

I think the water will have parted with all the matter which is much heavier than itself long before it gets into the upper part of the float. My impression is, that none of the heavier deposit in the float will get beyond the range of the sluices. I think it would not be carried further than the commencing current draught of

the sluices will carry away; and if found that any deposit remained without agitation, the simplest thing in the world would be, whilst those sluices were running, to agitate at the bottom, within the region of the draught of those sluices, and the deposit could not stop, it must go away. In all the mountain torrents running into the Mediterranean along the south of France, and from there all the way on to Genoa, if you examine them, you may tell exactly the velocity of the stream by the size of the material left on the beach. The maintenance of the upper part of the float must be by dredging in the usual manner; there is such a vast quantity of low land there that ought to raised, that I do not think there will be any difficulty in getting rid of what you dredge. *J. M. Rendel, 30 May, 1856.*

It is objected that, under the authorised plan, there will be a greater variation of level than under Mr. Hartley's plan. You will have a greater variation, but the variation will only be that due to the difference between the tide of the day and 13 feet; and, as I have said before, the mean of all the tides in the year, including those below 13 feet as well as those above, is 15 feet 6, taking in those below as well as those above. Now that would only make a difference in the mean of those tides of 2½ feet; then if you take the difference between the mean of those that rise above 13 feet, and up to spring tides, it is 16½, and that difference therefore would be 3½ feet; then if you take the difference between 13 feet and 18 feet 3, which is the ordinary spring tide, you have 5 feet 3 of difference; and if you take those extraordinary tides which rise to 20 feet, you have a difference of 7 feet. They have a greater difference than the latter in the Clyde, where, I believe, they would not have gates even if you made a dock; they consider that the gate would be a greater obstruction and a greater inconvenience than the difference in the range of the tide. Those variations in the height are not greater than is necessarily incident in all docks where you have large and small vessels combined; that is, supposing your dock level to be fixed and your quay level to be fixed, the variation is not half the difference between a large vessel and a small vessel lying at that quay. The same level should continue from the quay; the vessel should have, during the whole time she is discharging or taking in cargo, the same level. It is one of the greatest difficulties to accommodate at the same quay large and small vessels, and so respectively to adjust their loading and unloading as to avoid the inconvenience that does exist from the difference of level. I believe it can be the best avoided where you can afford to have two quays, one above the other—an attic quay. We are going to try that in the London Docks now on one side of the dock, so that it shall be convenient for either large or small vessels, the smaller vessels to discharge upon the lower quay, and the larger upon the upper; it will be carried out on cast-iron columns, each quay being arranged with reference to the particular description of vessel to be discharged. We propose to have the lower quay from three to four feet above the high tides, that also being the level of the floor of the vaults under the warehouses. The

Variation of level in the float.

Not equal to difference in size of vessels.

J. M. Rendel, 20 May, 1856.

upper quay we propose to have about 14 feet above Trinity datum, that being found to be about the most convenient height for the very large vessels to discharge at. With regard to the other question of a fixed and a variable quay, I believe the whole difficulty is to be overcome by proper arrangement of gangways; and I see no difficulty at all in so arranging the gangways that the difference in level shall be easily overcome. I believe it will be found much more advantageous that any variation of level should be rapid than it should be gradual, because a rapid change is provided for at once. A gradual change, such as is effected by the subsidence of the tide, would require two or three operations of lowering the gangways; the gangways could be easily managed. In Glasgow they are very nicely managed; but I believe not so completely as they might be by having their vessels self-adjusting, so that the plants which made the gangway could be raised or lowered with the greatest facility, to meet the high level of the float, or the low level of the float. The labour of discharging the cargo could not be helped in any way, unless you had what I was speaking of, an attic quay. We will take a vessel of 1200 tons; a vessel of ordinary build of 1200 tons will vary between loaded and light something like 10 to 12 feet. We find now that the great remedy for that, unless you have double quays, are the hydraulic cranes; we have got them to swing in this way, clear over the side of the vessel (*describing the same*). A large vessel perhaps will change her position as much as this line (*describing the same*). These cranes—this being the crane, and the post of the crane—swing in that way upon a point here and plumb the hatchway. This is all done by one man, who throws on the power and lifts a cask up to this level. Immediately it is lifted he alters the handles, and he swings the crane round on the other side. The crane turns; and they do that with extraordinary rapidity. I have seen twelve hogsheads of sugar unloaded from a vessel 13 feet above the quay, in a quarter of an hour. The great disadvantage, for which provision might be made, is, that if a vessel is fastened to a quay by the ordinary mode you have to attend to her; but that is the most absurd thing in the world, because a vessel may be fastened to a quay with self-acting moorings, and then the vessel does not want attending to. We find in the London Docks, and in the East and West India Docks, that every ship's berth is tripled in capacity of discharge by the introduction of the hydraulic cranes. By the common hand-crane the measure of discharge was the rapidity with which men could hoist, and that depended upon the number of men to be applied to the crane. Now we can move with a velocity, in perfect safety, of 200 feet a minute, with the heaviest loads on the crane; and it has this advantage, we are actually loading, and swinging while we are loading. The hydraulic crane makes the difference between the two different levels comparatively inappreciable.

Quays on two levels.

Self-adjusting gangways and moorings.

Rate of discharge tripled by hydraulic cranes.

Monday, 2nd June, 1856.

James Meadows Rendel, further examined by Mr. Webster.

J. M. Rendel, 2 June, 1856.

At Southampton the variation of level is as much as 14 feet, and that in a basin where all the vast business is carried on by steamers; the variation in the case of Southampton is exaggerated as regards the great float, and about half the change there would be in the low-water basin as the extreme. There are no gates at the entrance at Southampton; they have a dock inside the great basin with gates, but all the great packet business is carried on in the great open tidal basin, where there are no gates, and there the variation is about 14 feet; and I believe they find the greatest convenience at low water, when the vessels are low compared with the quay; and they coal all those vessels as well as take cargo on board. Those are all the great Oriental and West India steamers; more large steamers go there, I suppose, than anywhere else. The Liverpool Docks are worked to the tide of the day. Mr. Hartley could not be bound by any level in the great float. This question of the convenience or the inconvenience of a permanent level, if it were practicable, or of such a variation as there would be in the great float, was considered before Mr. Stephenson and Admiral Beaufort so fully, that it seems that, as far as those gentlemen are concerned, it would be almost a settled question, because the plan proposed by Mr. Abernethy, and which was a competing plan with mine, was one that would prevent the fluctuation of the level more that 2 feet; the principle of the plan was, that the highest level should be about 18 feet, and the lowest, I think, 16 feet; so that the level might have been considered as permanent within two feet. Those arbitrators contrasted the variation of 2 feet with the variation there would be in the great float. At page 12 of their report these observations occur: "Thirdly; that the maintenance of a tolerably uniform water level in the great float, notwithstanding its convenience, is not of very great importance, and has been overrated by those who gave evidence in favour of Mr. Abernethy's alterations of Mr. Rendel's original design. Fourthly; that the fluctuation in the water level would be almost every tide in Mr. Rendel's plan, whereas it would be less frequent in Mr. Abernethy's, but the amount of it, and ultimate extent of depression of level, would be nearly identical on both plans, and any necessity for deepening the float would be the same on one plan as another. Fifthly; that the cost of loading or unloading goods would not be sensibly increased by a fluctuating level, if proper appliances be introduced." That was the conclusion they came to after taking an immense amount of evidence upon the question. Considerable evidence was brought before them as to the cost of loading and unloading by hydraulic cranes at a fluctuating level. Mr. Armstrong, as the manufac-

Variation of level at Southampton.

Large steamers.

Conclusion of arbitrators as to variation of level.

J. M. Rendel, 2 June, 1856.

turer of those hydraulic cranes, wrote a report upon the question of cost of unloading in a variable level; the question was quite exhausted at that time, and since that time we have very much improved in that large question of crane power, and the appliances of it. All that has resulted since that time shows that, by proper application of crane power, the importance of difference of level is daily diminishing. As evidence of that I only need to state again, that since that period I have got introduced into the East and West India Docks, into the London Docks, and into the St. Katherine's Docks, this crane power, which overcomes every difficulty which existed upon the change of level. I have said already, I have myself seen taken out of one vessel twelve hogsheads of sugar by those cranes—the vessel herself being considerably below the level of the quay—in fifteen minutes. A fluctuating level, with proper appliances, is not a practical inconvenience, as is evidenced daily in the Liverpool Docks, where they have a fluctuation of level of many feet; there is no doubt about that. If it becomes of importance to have a fixed level for the unloading of vessels, you must attain it by other means than by the level of the water; you would have to make an indefinite number of docks, and to classify the description of vessels resorting to them, if you were to carry the principle of permanency of level to that extent; but it is not worth it. We have in the London Docks vessels discharging at the quay level and vessels discharging fourteen feet above the quay level. I referred the other day to the accommodation the low-water basin would afford to the 13,000 out of the 17,000 vessels that Mr. Hartley spoke of as coming into the port of Liverpool; it would afford them very good accommodation with proper landing-stages, and I see no difficulty in making those landing-stages at all. These landing-stages could be adapted to the different heights of the vessels that unload at them; and my full persuasion is, that every year docks will be comparatively disused, and the use of harbours comparatively increased. Docks were all very well when they were commenced in London, particularly with reference to the peculations that then went on in the river; but my firm persuasion is, that the question of dock, using the word in the way in which we use it, is one that is diminishing in comparison with the importance of the harbours; and I believe no vessel will voluntarily go into a dock if she can have the same accommodation in a convenient harbour—particularly small vessels. I think, therefore, every year the importance of that low-water basin and those quays will increase. That matter was fully gone into before Mr. Stephenson and Admiral Beaufort; at that time the comparison of convenience and inconvenience was greatly in favour of the low-water basin; Sir William Cubitt gave the strongest possible evidence with regard to the comparison of the value of the low-water basin, as will be seen. On the inquiry before Mr. Abernethy, on the Liverpool Dock Bill, the advantage of the low-water basin was spoken to by Mr. Hartley; if they could get it—that was Mr. Hartley's statement. A

Classes of docks necessary for a permanent level.

Harbours will supersede docks.

vessel would have to be tugged or warped into the great float, through the intermediate basin of Mr. Hartley. Captains of vessels dislike going into such narrow passages as we must make in forming locks and entrances, particularly if their vessels are large; no captain would prefer going through two such straits, or strictures, if one would suffice. You can hardly pass a vessel through a lock entrance without some chance of damage, and very often that damage is below the water; and the dock masters do not bear the consequences, but the shipowners do. I was not present when the evidence was given with regard to the danger of the warping a vessel along the wall of the north reserve, upon my plan, but I have read it since, and was rather surprised at it. I consider that it is altogether visionary. I cannot conceive how any captain of a ship could compare the probabilities of danger in a basin such as Mr. Hartley proposes in his plan, with the danger that could happen in a basin such as I propose. In the first place, I can hardly see how warps could be used across that basin at all. I cannot understand it. What I understand Captain Judkins, the nautical witness, to have said in his evidence, is, that if he was going to dock his vessel, he would bring her up on the last of the flood to this north quay here, and he would back her in. Now, it is very clear that, with a ship of that great length, immediately her head is thrown out from the wall, so that her stern may be warped round, she catches the tide, and if there is any north-westerly wind blowing, the tide and wind together would make it excessively difficult to hold her head by any warp, particularly as she comes round to back in; if anything happened to the warp, she would be placed directly across. I was surprised to hear Captain Judkins talk of docking a vessel in that mode, until I began to see how he did it. Anybody would say, do not bring up at the north pier-head, bring your ship up at the south pier-head, because there the wind and tide will rather help her in than keep her away from the entrance; but then Captain Judkins saw the difficulty if he brought his ship up to the south pier-head, so as to have her head to the stream: he would have to cross the basin before she could go into the 100 feet lock—that he would have to point her to the 100 feet lock; and if there were any wind or sea up, I do not see how he would accomplish it. And during the whole of this period all the entrances would have to be stopped; not a vessel could go in here. I do not estimate the least highly the danger of warping along the south wall of the north reserve in my plan; immediately the vessel passes this pier-head, on my plan, she is in still water, perfectly out of the stream; and if she is a large vessel, she is either under steam power with a tug, or under warp power by the capstan. A north-west wind would very little indeed affect her, particularly in this large basin, because she would have no sea; but that will be spoken to by persons to whose experience I would bend, although I know something of taking vessels in and out of docks and harbours. All the pilots speak of bringing large ships to the south side, and I should be surprised if they did not;

J. M. Rendel, 2 June, 1856.

Injury to vessels in narrow entrances.

Facility of warping along wall of north reserve.

J. M. Rendel, 2 June, 1856.

because I do not see how, upon a flood tide, a large vessel could be warped round the north entrance to that basin, either Mr. Hartley's or mine. The evidence of them all was, that they should dock upon the flood tide; they would, as a matter of safety. The pilots spoke with regard to what is the rule at Liverpool; and if at Liverpool, where a vessel is under command by the horns they throw out, so that the warp may be easily obtained—if a vessel there is docked from the south pier-head, how much more would that be necessary in an entrance where the handling of the warps would be so difficult, from the breadth of the entrance. A large vessel would be brought in before the top of high water with her head to the flood, and then taken in by either plan in that way either to his dock or into your low-water basin; if there was any wind blowing that would be the case: but the advantage of a large basin over a small one is this, that even those large steamers might be docked by steam-tugs if the weather was bad, and they did not like to apply their own power. Take the last hour of flood; they would come up in this way, and gradually turn into that basin: if there was very much wind, or if there was very much difficulty, the tug would in all probability leave the large ship at the south pier-head, and then she would be warped in from the south reserve shore. There is not the smallest difficulty in crossing the mouth of the Birkenhead Fork; the distance from the pier-head to there is only 350 feet, and the warp would be perfectly under command. But my impression is, that a large steamer would, in the use of this large basin under adverse circumstances, go in by the aid of a steam-tug, or she would use her own paddles at about one quarter speed so as just to give her steerage way, that is under adverse circumstances. Under favourable circumstances, of a calm day, I believe they would run in at that time of tide when they would not want to lock at all, for at that time of tide nearly all the ordinary business of the dock would be done. But I know there is some very important evidence coming from persons who have handled those large steamers under every circumstance of difficulty. So far as my attention was directed to that as an engineer, it was under the supposition that the practice at Liverpool was to bring the head of the ship to the tide. Captain Judkins was the first witness that spoke of docking with the tide; I could not understand it till I observed that he would be in this dilemma; that if he had not so docked he could not have got the vessel into the 100 feet lock; he would have had to cross the basin: that explained the thing to me at once. By the arrangement which Mr. Hartley proposes, his object is not to allow vessels to collect in the outer basin at all, but to get them as rapidly as he can into the dock; if he were to change the lock, the difficulty would be this—the great majority of the vessels being such as would use the 50 feet lock, and being therefore accommodated by rounding in on one side, if he were to make this his 100 feet lock, and that his 50 feet lock, the consequence would be, that he would expend so much

Docking on flood tide with head to stream.

Mode of using Mr. Hartley's entrances.

more water in locking his vessels to and from the half-tide basin, because he would have to pass them through the 100 feet lock instead of the 50 feet lock. The small vessels would have to be accommodated at an earlier time of tide, when the tide is running stronger, and consequently when the crossing of the basin would involve still greater difficulty. You cannot with any degree of propriety, even in fine weather, allow of the collection of vessels in this basin; the rule must be to pass the vessels from this basin into the half-tide basin, or into the intermediate dock, as fast as they arrive; and if that be not done, any vessels coming to this point would be still more incommoded than they would be otherwise. I have said I would change the position of my largest lock; the argument does not apply in this large basin, because I have already said that my idea is, that nine-tenths of the vessels coming here would pass in when the gates are open, except when the tide is below thirteen feet, and then we should of course lock them; but you see, we are entirely out of the stream of the tide in this basin, so that we can handle large vessels with the greatest ease; but if there is any wind up there, and a bubble of sea in this basin, if you were to put a small vessel there she would be knocked to pieces. The walls of the low-water basin are twenty-seven feet above the Old Dock sill, so that all the smaller vessels would be effectually protected by the height of the walls at the time of the tide when they would enter. *J. M. Rendel, 2 June, 1856.*

There is a very great objection to your penning up to anything like a uniform level so large a mass of water as that is running inland, without change; the health of the people there would be at stake, unless there is a large change in that quantity of water every tide. A dock of that kind, two miles and a half long, at right angles with the main stream, is a thing that does not exist anywhere else; the evil that has resulted from penning up the water at Bristol, which everybody knows is very serious to the town, would operate there. At Liverpool that is obviated by the constant change that takes place in the water of the docks. According to Mr. Hartley's plan, lockage is the rule, and going in without the exception; according to my plan, lockage is the exception, and going in without lockage the rule. Consequences of penning up large mass of stagnant water.

I am prepared with an estimate of the cost of completing the authorised plan, having regard to the works already done. This estimate is based upon the drawings, as prepared for Messrs. Brassey and McCormick's contract, of what is requisite for the completion of the work, according to the Acts of Parliament. I have added two caissons for the passage between the Egerton Dock lock and the Morpeth Dock lock—those were not in the Messrs. Brassey and McCormick's contract—that being intended to be done by the Trustees, when the works were further advanced; there would be a 70 feet caisson there, and a 30 feet there in the passage, not shown upon the plan; there is a 30 feet passage between the line of wall arched over, not intended for the passage of vessels, but made with the view of reducing the velocity of Estimates.

J. M. Rendel, 2 June, 1856.

water passing through this passage in supplying the sluices of the Birkenhead Fork. There is a caisson between the Egerton Dock and the Morpeth Dock already. The estimate for the excavations and walls of the great low-water basin is 256,013*l.*, in fact, all but the works of construction, which I will give now: for the great 100 feet lock, 103,656*l.*; the 100 feet passage, 39,974*l.*; the great sluices between the 100 feet lock and the 100 feet passage, with the completion of the Egerton Dock lock and all the hydraulic apparatus, 40,691*l.*; the Egerton Dock lock, the one between the Egerton Dock and the great float, has only one pair of gates, and inside there are two more to make; there is a bridge to be put across there, and there is the machinery of the sluices to be fitted; 25,000*l.* the carriage-road and the railway to Seacombe, being the formation of a road across this land as a public walk, and a railroad on this point (*pointing out the same*), continued on to Seacombe, according to the Act of Parliament. The formation of the road beyond will come, like Mr. Hartley's, in a separate item, 3,394*l.*; two caissons for the 70 feet and the 30 feet passage before referred to, 10,000*l.*; that makes a total of 478,728*l.* Messrs. Brassey and Company had taken it at a very much larger amount, because they took bonds; we had to pay them 20s. for 14s. worth of work; but this is a price we can get the work done at to-morrow by responsible people.

Comparison of works and cost.

Comparing this total of 478,728*l.* for completing the authorised plan with Mr. Hartley's estimate of 680,000*l.*, the difference is 201,272*l.* Mr. Hartley has so many more locks; the difference is simply this, that if we put Mr. Hartley's lock, and his 100 feet passage, against my 500 feet lock and my 100 feet passage, the only thing we have is this, the abandonment of the 50 feet lock and all those passages within; therefore I dare say Mr. Hartley's data of estimate and mine are not very far off. Taking the whole of the works to be completed by all the existing Acts authorised, the figures would stand thus: Mr. Hartley's, 922,019*l.*, and Mr. Rendel's, 715,947*l.*, for the entire completion of the work on the two plans and doing what is now proposed to do to bring them up to the same level of completeness. The works completed according to the Parliamentary powers on my authorised plan would cost 715,947*l.*; and Mr. Hartley's estimate for the completion of those works by his plan would be 922,019*l.* Mr. Hartley takes, and I think he is quite right in taking it, because his works are of a kind that would involve a large amount of labour that could not be hurried, five years as the minimum; and I think that is small, because, as he says, he must, to carry out his works, make a new dam at the mouth of the pool. I have no doubt I could find a person who would complete mine, under a guarantee, in three years, and without a guarantee I have no doubt he would complete them in two years and a half, supposing that two years and a half to embrace three summers—three working seasons. The entire plan might be carried out in that time, because the inner works are works of very easy construction, and therefore do not constitute the measure of time;

Period of completion.

the works that would constitute the measure of time by either plan, the works which involve the questions of time in my plan and Mr. Hartley's, would be the series of locks; they would involve a great deal of time and care. Mr. Hartley does not fill in the land of the south reserve for his estimate of 680,000*l.* My plan of necessity involves the filling up of the south reserve, because I lay the spoil from the great float and the basin there; also the completion of other land at Bridge End; I should complete both, up to 27 feet upon the Old Dock sill—the south reserve, and Bridge End land, which, according to Mr. Brassey's contract, would have brought the Trustees in 140,000*l.*, and 70,000*l.* in reduction of the cost of the works.

J. M. Rendel, 2 June, 1856.

Filling in of south reserve and Bridge End land.

Cross-examined by Mr. Merewether.

Cross-examined.

If that contract had gone on the land would have gone from the Dock Estate to Mr. Brassey. I appear here for the Cheshire Junction Railway Company alone, although I have been in frequent communication with Mr. Brunel, who represents the Great Western. The Great Western ends at Chester, with running powers over the Chester Junction. The Cheshire Junction Company have a lease under the Dock Trust of this quay and of this land (*pointing out the same*). This is a plan of the Dock Company's land, and of that which is now sold to the Corporation. In regard to property and rails they have nothing on the north side of the Morpeth Docks; they have only the right of using those rails; they never had Parliamentary powers to make them that I am aware of. The Great Western having from Chester running powers over this line, have such rights as the Cheshire Junction has, and only such. The Shrewsbury and Chester, now the Great Western, acquired certain rights of ground for station purposes on the south reserve; as I understand they have built sheds on the south reserve. They have built up there a long goods shed, and fitted it up with cranes and appliances for business; they are carrying on, I believe, a considerable business there. I constructed the extension of the Cheshire Junction. The old Grange Lane station of the Birkenhead and Chester Railway was about a mile and a quarter from the docks, and the Extension Act authorised their making a mile and a quarter to the docks; that was passed in 1845. This map shows it: the original passenger station was there, then they extended it to Monk's Ferry. That was in existence when we commenced the dock works; and the railway company came to Parliament in 1845 to make an extension from Grange Lane down to the docks, as shown here, and that is the extension as to which the learned counsel is now asking me a question. I do not know whether the Cheshire Junction have any lease, or whether their use of any lines north of the Morpeth Dock is not simply permissive. I know they negotiated a lease; I know they use some of those rails. I was at the same time engineer to the Dock Estate. At the time when the extension was

Rights of railway companies.

Extension line.

J. M. Rendel, 2 June, 1854.

making, I advised the Dock Trustees to have a plan made of the boundary of the Dock Estate of the most precise kind, and to have boundary stones put. I found that parties were bordering down close upon the Dock Trust rights, and I thought were encroaching upon those rights. I found also some confusion growing up between the railway company and the dock company, and I strongly advised the Trustees, as responsible public officers, to have a plan of the boundaries made whilst those were living who understood where the boundaries were. I advised the Dock Trustees on no account to permit the railways to come into the dock property without proper payment for the use of the rails. I found that the Dock Trustees had laid down about 10,000*l.* or 12,000*l.* worth of rails on the Morpeth Dock quay. I found that the railway companies were using those rails without paying any acknowledgment for the use of the rails. I advised the Dock Trustees to give every possible facility to the railway companies, but upon the understanding that they should pay something for those facilities, considering that, although the docks could not exist without the railways, the docks were bestowing such advantages upon the railways that the railways ought to pay for the use of those rails. If you press me as to the absolute identity of interest between the dock proprietors and the railway proprietors, I will say this: I can fancy those docks in the hands of parties who do not identify themselves with the railway interest. My reason prompts the answer I have given. My reason tells me that a difference of opinion as to interest may exist between the owners of the dock and the railway companies, and I will point out at once why. The whole of this property that I have before pointed out to you, extending pretty nearly two miles upon this shore of the great float, is held by the Corporation of Liverpool. I can perfectly understand how the extension of the railways to this low-water basin might, in the judgment of the Corporation of Liverpool, clash with the application of that land. [*By the Committee.*—That is to say, if the low-water basin and the float, upon my plan, would suffice for the discharging of the contents of steamers at once into the railway trains, of necessity the value of dock accommodation on the southern shore of the great float would be lessened.] I do not impute direct motives; you have not correctly derived my meaning. What I do mean is this: that the Corporation of Liverpool is not one man; that the Corporation of Liverpool is, like every other corporation, influenced mainly by their own individual feelings; and, knowing what those feelings have been hitherto towards Birkenhead, and all the interests of Birkenhead, I would rather not say one word upon this matter; but if you press me, I say this, that if I were a railway-company man, I should say, do not let me lose the opportunity of bringing the railway traffic to the south reserve and to the low-water basin, because you will then throw me upon the Corporation land in the great float. I do not impute to the Liverpool Corporation, whether one man or a million, that, having made an

Railways to have every facility on paying for it.

Conflicting interests.

South reserve to be dedicated to railways.

expenditure upon Mr. Hartley's plan, they would throw impediments in the way of the railway because they have got land at another point. I will not impute anything. You have asked me a question, and I have given an answer, and my reasons for the answer. I decline to be made to say whether I impute motive. The Committee will perfectly understand why I do not want to be pressed upon that question. I do not think it fair. I know the whole history of Birkenhead from the very commencement, and I know what has been the feeling on the opposite side of the water about it, and I do think I ought not to be asked whether I would directly charge the Corporation of Liverpool with improper motives. I do not charge them with an improper motive. This is, to all intents and purposes, public property; and I say, as public property, it ought to be devoted to trade and the railway system communicating with Birkenhead. I have always said so, and I say so still. I say the railways, having expended so much money—this short line cost the railway company nearly half a million of money—they ought not to be made dependent for the land, upon which they could accommodate all the public traffic, upon the Corporation. [*By the Committee.* —My plan contemplates the raising of the south reserve up, to make it dry land—in short, sound land 27 feet above datum; and my conviction is, that either the station should be made upon that side, or perfect access given to both those railways on to the south reserve, so as to take advantage of whatever means of discharge may exist, according to my plan, by the works. Mr. Hartley's plan, on the contrary, leaving the land in the state in which he told the Committee, it would ultimately be economical to use that land for additional docks; there would be less convenience for the economical use by the railways of intercourse with the Mersey; and in addition to that, if Mr. Hartley were to fill up the whole of that land, the land is destroyed for a railway station; it has not that access to the river which it ought to have for a railway station. Any traffic coming to this land by river craft or steam ferry-boats, would have to be brought into this small basin, because the railway traffic will not tolerate locks for a large class of their traffic, if the trade of those barges and steamers had to be locked. I will even suppose the plan were to set apart the whole of this quay, which it cannot do, because it would interfere so much with the vessels coming in; but even if they did, it would not accommodate the description of traffic which it is all-important for the railway companies to have, namely, river steamers, and freedom of access by river steamers. If, according to Mr. Hartley's plan, docks were formed, and the rest of the land made into firm ground, the railways would not communicate efficiently with the system which he would have so created.] The Cheshire Junction never, that I know of, tried to get on the south reserve by any plan before Parliament. The Great Western, who have got on the south reserve, supported Mr. Abernethy's plan, as I understand, upon the conditions—it will be for them to state whether they did so or not—first of all, that

J. M. Rendel, 2 June, 1846.

Railway companies should be independent.

J. M. Rendel, 2 June, 1856.

they should have the free and uninterrupted use of this Birkenhead Fork, which was not destroyed, as in Mr. Hartley's plan, but still existed; and also have a grant of the whole of the land of the south reserve. There was a period when Mr. Abernethy was engineer to the Trustees.

Railway bridge over Morpeth Dock.

When I came back as engineer, I found a bridge across the Morpeth Dock, for the communication of the railways with the north side of the Morpeth Dock; I advised the Trustees to have the bridge taken down; it was taken down by that advice, and I stopped the railways upon the south side of the Morpeth Dock. I found that they had placed a drawbridge across the entrance between the Morpeth and Egerton Docks, of a description that would be very troublesome indeed to open; and whilst that remained the only passage into the float, it became absolutely necessary that a bridge should be constructed upon a better plan. I also advised the Dock Trustees to do everything in their power to resist the then intention of the railway company to cross that bridge, for this obvious reason: that no adequate terms of remuneration of the Dock Trustees had been proposed in that arrangement. Although Mr. Abernethy constructed that bridge under the direction of the Dock Trustees, the Dock Trustees had made no sufficient arrangement with the railway companies for remuneration for the use of the rails. That bridge has been replaced with my full concurrence, approval, and assent, as Mr. Brunel will tell you, because that bridge has been altered. It works now in a way which satisfies me, as the engineer, and the railways pass across it. A lease has been taken by the Great Western Railway Company of that land on the south reserve, on terms which I settled myself with Mr. Brunel; and the objection no longer exists to the bridge being there.

Lease of south reserve.

When I returned to the engineership of the Dock Estate, I found that the lease given to the Shrewsbury and Chester Company of the land on the south reserve was for a very long term; I advised it should be reduced to twenty years, and I will tell you why: I myself induced the Crown to give that south reserve to the Dock Estate for the purpose of aiding the works; and I certainly did not consider that it would be wise or proper for the Dock Trustees to tie up that property on a lease for more than twenty years, because, by so doing, they would so far depreciate the sale of the south reserve so as to interfere with the completion of the works. I would have sold it to anybody who would have provided the money for carrying out the works. Mr. Brassey afterwards bought it. I was content that he should buy it if the money was laid out for the completion of the works. I uniformly advised the Dock Trustees on the propriety of that being retained for access to the low-water basin, and I took care, under all the circumstances, to reserve a public quay of 200 feet along the whole line of that wall. When Mr. Brassey became the contractor for the works, I advised that they should appropriate the south reserve to him for 140,000*l*. I knew that the only parties who could give that sum of money for it were the railway companies and

Mr. Brassey; they opened a negotiation with the railway companies. I know it was Mr. Brassey's plan to make a dock upon the south reserve; I did not project it, but Mr. Brassey projected it in 1853, and I sketched it out in 1854. I have the correspondence; the circumstances will very soon appear how that arose, and I do think it very material. The facts must be all stated, because the inference may be false unless all the circumstances are stated. Mr. Wagstaff, who was Mr. Brassey's solicitor, in negotiating this contract with the Birkenhead Dock Trustees, applied to me to act as the engineer for laying out a dock upon the south reserve, and upon that application being made I wrote to Mr. Wagstaff, upon the 10th of November, this letter: "My dear Sir,—As promised last night, I enclose herewith a sketch for a dock, of the description which I think suited to the form of the south reserve. You will, of course, understand, as I verbally explained to you, that in sending this sketch to you I must neither be considered as pledging myself to support such a scheme in any manner, unless the Dock Trustees, with the concurrence of the bondholders, should accept it as calculated to promote their interests, nor as in any way compromising my position as their engineer, should they determine to oppose it in Parliament." Being in the employment of the Dock Trustees, I could enter into no engagement with an individual, Mr. Brassey, without keeping myself entirely free to act upon behalf of my first employers; and also having regard to my previous opinions that the south reserve was not a good place for docks; I have stated that repeatedly. This is the plan which Mr. Brassey deposited, I having sketched it out; this is the Morpeth Dock, and here is a public quay of 200 feet in width; this was a small dock excavated out of the south reserve, the railways being intended to occupy this and that quay, on to the low-water basin; a quay against the low-water basin there; first of all there is the public quay of 200 feet, and then there was a quay up to the dock of 200 feet more; the dock was entered from the Morpeth Dock; not entered from the tidal basin at all, because I thought the Dock Trustees ought not to have that interfered with. There was an arrangement between Mr. Brassey and the Dock Trustees that they should have the power of redemption upon paying the 140,000*l.*, and that they also should, if they could raise the money, pay that money, 140,000*l.*, instead of conveying the land. I do not know that, if all things had gone according to the intention and the purpose under which my plan had been prepared, there would have been a dock upon the south reserve. The circumstances were these: at this time Mr. Brassey felt that it was necessary for him to get money other than from his own resources if he was to go on with those works, and this dock was projected by Mr. Brassey with a view to induce the railway companies to buy the south reserve; there is no doubt about that. The railway companies did not buy the south reserve, and the Bill was dropped, as you know. It was abandoned for this reason: Mr. Brassey having dropped the Bill, the Dock Trustees con-

J. M. Rendel, 2 June, 1856.

Projected dock on south reserve.

Railways to come to low-water basin.

J. M. Rendel, 2 June, 1856.

sidered a short time whether they would keep it alive; and whilst they were considering that question they received notice from a party at Liverpool that they would have an injunction against them if they proceeded. The solicitor to Mr. Brassey's Bill was Mr. Wagstaff. I designed it, but I did not put my name to the plan. My plan for the low-water basin was then the authorised plan. I do not consider that Mr. Brassey thought the advantages of the low-water basin were inconsistent with a dock on the south reserve. Mr. Brassey's object was to get the south reserve turned into money, 140,000*l.* He had a plan for a dock; it is not to be inferred then from that that he considered the advantages of the low-water basin were inconsistent with the advantage of a dock upon the south reserve. My inference is, that Mr. Brassey wanted the railway company to give him 140,000*l.* for the south reserve, and he was to apply that money for going on with the works, and the dock plan was only a plan to sell.

Interference with public rights.

I am not aware of anything in this Bill which affects any existing public right, but I can perfectly understand, if you were to make a dock upon the south reserve, as Mr. Hartley proposes, there would be a most serious infringement of those public rights. Except in the use of the low-water basin, I see nothing in the Bill which affects the public rights. Inasmuch as the low-water basin is a public harbour, under the existing Act, you are going to destroy that public harbour by your Bill.

Sewers into culvert.

I have spoken of the culvert that runs through that property as a sewer—I peremptorily resisted the introduction of sewers into that culvert, but I failed. A great many sewers come into it, principally along Canning-street, and all along there. I have been obliged to have them made myself, much against my will.

Width of entrances and gates.

In my plan of 1843, the width of the entrance of the low-water basin was 500 feet. The first deposited plan was 300 feet; the deposited plan had the same form of entrance as that, 350, and 500 inside. That was the plan I altered in the Committee in the House of Parliament. The plan deposited in 1844, after the Bill had gone through Parliament, was 500 feet. The width of the entrances to the low-water basin has varied from 500 feet down to 350 feet, as I have reduced the size of the basin. The present width is from 400 feet to 500 feet in the basin from the forks, and the entrance 350 feet; the length of the basin has always been preserved, which I hold to be the important thing. I said that Mr. Brassey's reason for discontinuing the further proceeding with the work was the Liverpool Corporation bringing out the north shore docks; he never said anything about the low-water basin as the reason; he never expressed to me a single objection to the low-water basin; on the contrary. I could put a double gate with ease; the cost would be 14,000*l.* or 15,000*l.* In the course of my examination I said that time had modified my views about certain things, and that the progress of matters had suggested alterations to me. I must be very obtuse if I did

not see a change taking place, and provide for that change. I would put the lock upon the other side for two reasons. I can save in that lock all the difference of the cost of the second pair of gates if I put it on that side. That lock would have been placed there originally, but for the reasons I have given you. I asked the Crown for permission to do that, and it was considered, as I understood, by the Crown, in consequence of the report made of the value of the north reserve by the present Mayor of Liverpool, that this land was so increased in value by the frontage to the low-water basin, that any interference with that frontage would depreciate the value. The Liverpool Corporation have given 100,000*l.* for the land on that side; the Mayor having valued it for the Crown at 60,000*l.* I mean to say the land was valued for the Crown at 60,000*l.* by Mr. Stewart, who has since become the Mayor of Liverpool; and the Liverpool people have bought it of Mr. J. A. Smith, I am told, for 100,000*l.* Mr. J. A. Smith applied to know on what terms the Crown would sell it; and he bought it of the Crown for, I think, 60,000*l.* in cash, paying the 22,000*l.* that the Crown was liable for. That sum includes the 22,000*l.* which the Crown has to pay for the wall. [*By the Committee.*—That is, Mr. Smith gave in 60,000*l.* in cash, paying the Dock Trustees 22,000*l.* This agreement with the Crown was, to give them 60,000*l.* in cash and to have ten years to pay the money in, and to pay the Dock Trustees the 22,000*l.* which the Crown was liable to the Dock Trustees to pay. I do not know whether the 100,000*l.* is to be paid immediately by the Corporation.] I cannot undertake to say it was upon the present Mayor's advice that the Corporation have acted; that is the inference. Mr. Stewart stands as high as any man in Liverpool. The interval of time between the two purchases was, I suppose, not more than twelve months. The wall was there before the Crown sold it. The sale to Mr. Smith was in 1853. I spoke of landing-stages along the south side of the Birkenhead Fork; they form no part of any deposited plan; they would be an improvement upon the last plan; a landing-stage is a very convenient thing in a sheltered situation; the landing-stage, on the Liverpool side, is not in a sheltered situation. I have no doubt that they have found that act so well, that they are increasing the size from 500 feet to 1000 feet, because the Liverpool shore was before that entirely without accommodation for landing traffic; and that landing-stage was an enormous boon. I have crossed the Mersey when even the ferry steamers felt some hesitation in crossing. I assure you that the landing at that stage is not so comfortable as you imagine, nor would it be at Birkenhead off the Woodside Basin. I did not know that the Woodside Ferry was protected, and its rights reserved by Act of Parliament; but my idea is, that if the railway companies are to have a traffic, such as would be consistent with their interests, and with the public interests, there would be a succession of steamboats into that low-water basin for every train. The trains of boats go up the river generally; if they went into the dock they would

J. M. Rendel, 2 June, 1856.

Lock changed to north side of basin.

Purchase of north reserve.

Landing-stages in Birkenhead Fork.

Ferry traffic to low-water basin.

J. M. Rendel, 2 June, 1856.

go principally, I should say, at low-water into that lock. I am speaking now of the way in which steam-tugs would take trains of boats into the Birkenhead Fork—I am not speaking of it with regard to Liverpool. On the Liverpool side a steamer may take a train of boats along, and drop the boats intended for certain entrances at those entrances; but then the steamer does not take them into these entrances as she would in this case. I believe very frequently now they put two trains abreast, and take sixteen barges. The length would be perhaps 300 or 400 feet —that would depend entirely upon the state of the weather and the river, and the state of the trade. Assuming such a train as that coming in, the ferry steamers would have the option of going anywhere between the commencement of the Birkenhead Fork and its head at the south reserve. I should say that the lock entrances would hardly begin to be used until after half-tide, because large vessels do not come up much before, and I dare say this would be the chief lock used before that. My proposed landing-stages would be upon the south side of the Birkenhead Fork at intervals, replacing the slip upon the plan. I should think all the coasting steamers and all the river steamers would come there—I mean all that resorted to Birkenhead; I do not mean all that come into the Mersey, because Liverpool will always be of course a place to which they will go. I would have all the river steamers and the trains going in, and the landing-stages for the steamers in the coasting trade; I mean all the river steamers coming to the railway. The river steamers going to Woodside, to Seacombe, and to Birkenhead Ferries, would not come there of course, and therefore it is not all the river steamers, but those coming to the railway. I consider that you would have steamers there for every train, and from every train; and if, therefore, you had five arrival trains and five departure trains a day, you would have five arrival steamers and five departure steamers. I read Captain Judkin's evidence; I could not understand why he berthed his vessel at the north pier-head; I did not hear Mr. Macivor's, his master's, evidence. In reading Captain Judkins's evidence, and considering Captain Judkins as an authority upon questions of that sort, I could not comprehend why he put his vessel to the north pier-head, knowing that the pilots all put their vessels upon the flood-tide upon the south pier-head, until I observed that it was to get over the difficulty of the position of the 100 feet lock. I know what is the practice of the pilots. I know that the pilots have given it in evidence before this Committee, that that is the mode in which they would dock a vessel there. The difficulty is apparent. I see the difficulty, and any man going into that lock would see that the difficulty is to get across that basin. I think that my plan offers a much easier mode of warping than Mr. Hartley's. It is not a greater distance, because every vessel that locks through those entrances must warp from the pier-head into the float; it is the same distance upon Mr. Hartley's plan as mine from the river to the float. Now, not only have you to warp the same distance in both plans, if warping is

Steamers to railway.

Practice as to docking.

the operation to be performed, but you have to point your vessel twice to go through those entrances instead of once. I think that a vessel is equally at ease at one point along my wall of 1800 feet as when it has got into Mr. Hartley's 550 feet lock. To dispose of that question let me say, that in my opinion, knowing something about the trouble of passing vessels through locks, I would rather warp three times along the line of the wall, with a sufficient breadth outside the vessel to leave me comfortable room to keep her off the wall, than I would warp half the distance through a lock. I do not call the low-water basin a harbour of refuge, though many vessels would be saved by it. Many small vessels have been lost upon the entrances on the Liverpool side; and, I believe, if that low-water basin had been made, they would not have been lost. That was not from the narrowness of the entrance; the vessels got in and could not dock, I suppose, and became exposed to more sea than they could bear. It is a matter of superiority in my plan over Mr. Hartley's, that a vessel has to go along walls and not into locks; as to warping it is an advantage; and as to tugging, it is of infinite advantage. I did not say that a warp is perfectly at command at 350 feet. You have not quite understood me; I will show you what I mean. I will suppose I am going to pass a very long steamer under adverse circumstances into that lock; I suppose I have to point her. Take the Persia, which is 360 feet long. If the Persia came into the basin, and was berthed at this wall previous to her being pointed to that lock, she would be moved ahead so, from the point of my stick; her head would be somewhere about 250 feet from the capstan of that pier-head. Now in this basin, these gates being opened, she would be pointed and warped into that lock in less than five minutes; she would not encounter all the difficulties of the lock entrance until she was clear of this jetty. In Mr. Hartley's lock she would encounter the difficulties as soon as she got in. The Persia is 380 feet over all; she would have her stern at this wall and her bow at that; the only interruption she would offer to the traffic would be while she was moving under capstan power—from this capstan to that. I was right in saying that in still water a warp is perfectly at command at 350 feet; but I do not contend that a warp is at command if that warp is applied to a vessel exposed to a running stream, such as you would get in the Mersey; you cannot hold her. With a north-westerly wind the north side is the weather side and the south is the lee. Then the Persia would be working into Mr. Hartley's dock, exposed to the full stream, to the weather, and to the wind. A vessel could be fendered on the lee side but not on the weather side; she would not want any fendering on the weather side, where the operation of the wind would be to blow her off; and therefore she would want warping. I have said already that a warp of 350 feet is perfectly under command if the vessel is in quiet water. I have said that it is perfectly beyond the power of command if the vessel is exposed broadside to the stream of the tide; the distinction is as broad as a distinction can be drawn.

J. M. Rendel, 2 June, 1856.

Warping at respective entrances.

Warping and docking of large steamers.

J. M. Rendel, 2 June, 1856.

I think that I can, by my process of sluicing, keep this great low-water basin clear; and I have no doubt that, with the trade that will resort to the basin, it will be so; a great portion of that trade being steamers, there will be another disturbing power which will assist it, and the vessels in the basin also. My conviction is, that there would be through the sluices a stream of water, making a river such as would throw the deposit out a sufficient distance beyond the mouth of that low-water basin as to form no bar there. The mean velocity with a 20 feet tide is, at the mouth of the basin, 8·8 feet per second. With an 18 feet 3 tide, the mean velocity is 7·9 feet per second. With the mean of all tides above 13 feet, which you may take to be 16 feet 6, you have a mean velocity at the mouth of the basin of 7 feet—that is the description of mean which I intend. I said the other day that I do not think the discharge in the sluicing would be daily. In 1847, I said that the daily accumulation—for there will be an accumulation in the basin every tide—may be removed before the next tide. I will explain it. I say now, that I believe there will be a daily accumulation; but there will be occasionally—six successive days, as an extreme—when you may not be able to sluice, and then come the rising spring tides, until the tides get down again, say to 15 feet, for sluicing out all that has been deposited in the basin. While there may be six days in which there will be six days' accumulation, those six days will be followed by the best column of water, and that will be sufficient for sluicing it out. There may be six days; that is the extreme; you may take the average at about three to four days. I do not calculate upon that deposit being comparatively uniform over the basin; it will be most at the mouth of the basin. I think there will be some beyond that, but comparatively small and lighter. I have explained already that the deposit in the Liverpool Docks, inside the basins, is, from the indraught of the gates; the indrawing stream takes in with it matter in suspension; and the velocity of the stream, as it enters the mouth of the basin, is continued, from the smallness of the size of the basin, until it gets into the docks; the indraught decreases in velocity in proportion to the increase of the area. After the discharge from the sluices, the velocity of the water discharged will diminish every step in proportion to the increase of the area. The law is, that the quantity being the same, the velocity will diminish as the sectional area increases: no doubt of it. The reason why I have contracted the breadth of the basin at the junction of the Birkenhead Fork with the main fork, and again at the mouth of the basin, is so to increase the velocity of the outgoing stream, that it shall have the requisite strength of current to do the greatest quantity of work that is to be done at those places. I do not quarrel with, or cavil at, Mr. Hawksley's assumed velocities. Mr. Hawksley enunciated what is, I believe, a law; that the projectile force due to the head ceases within about three times the distance of the working head from

River through the low-water basin.

Accumulation during six days.

Law of decrease of velocity.

the point of discharge. As the working head in that case is 25 feet, therefore three times is 75 feet; so that at 75 feet from the point of discharge, Mr. Hawksley said, the velocity is reduced by being diffused in the whole mass, and passing off as in a river. The velocity is continuous, and increases as we decrease the section. Mr. Hawksley told you that the velocity would be greater at those narrows than in the wide part of the fork. Mr. Hawksley illustrated upon the diagram to the Committee what he meant by this water passing off as a river. I will endeavour to explain what Mr. Hawksley has much better explained. Taking a tide which rises 20 feet upon the Old Dock sill, at the moment of opening those sluices, the velocity of the discharge at the sluice will be 33 feet per second; that is due to a head of 26 feet. Mr. Hawksley told you that if you multiply that head of 26 feet by 3, that would be the point at which the velocity of 33 feet per second would be lost by being diffused in the whole mass of water in the basin, and that then the whole mass of the water in the basin would move on at the velocity due to its sectional area. But the velocity does not cease there; it abates. The velocity abates and diminishes in proportion as the area is increased. But you see in that basin, every step you go from the sluices, the area increases. The whole of this is paved for a distance far beyond the projectile force; and then, after the water has passed beyond the point of the projectile force, the river moves over the bottom of the basin, as it would move over its own bottom, and there is none of that breaking up which you speak of. The effect, when it leaves the paved part, upon the natural bottom of the low-water basin will be to move on, at a velocity which I believe will sweep out, or, to use Sir William Cubitt's term, broom out, all the stuff that has accumulated there. You will have at the junction of two streams, not sufficiently strong to remove the deposit, an accumulation; but then, I suppose, in that low-water basin, where you have a junction of those two streams, you will have such a diminished section that the current will remove all accumulation. If you walk upon any beach you will find that heavy deposits are not made in deep water; heavy deposits are always made where the waves break, and consequently where the action of the wave by running up the plane, by a succession of blows, will send up hard gravel and coarse matter. My belief is, that we are all of us—and I state this most deliberately—my belief is, we are all of us overrating the effects of accumulations in tidal basins. I believe the effect to be, that heavy matters are not deposited in basins of that kind. I have never known coarse sand thrown up except by a wave. Take the Chissel Bank at Weymouth—it is a most extraordinary thing—there you have a most terrific sea acting upon the one side, and comparatively quiet water on the other; and what do you find? You find there a barrier of a mile and a half in length, composed entirely of gravel and sand; a great deal of sand below. I have bored in it: immediately

J. M. Rendel, 2 June, 1856.

Diffusion of motion in basin.

Action of current from sluices.

Deposits in tidal basins over estimated.

J. M. Rendel, 2 June, 1856.

Formation of Chissel Bank.

you get below low water you get into the sand. I do not believe below low water you would find as many pebbles as would fill this room upon the whole of that extent of shore. The action of the wave throws up the gravel; and it acts upon the gravel in such a manner that it is really thrown up 35 feet in one part above the ordinary level of high water, just simply by the action of the wave creeping upon the bank, and leaving the gravel there, because in its return it has less force than in its action upon the beach where the gravel is left. It is left there because the wave is more powerful than the stream. The material is put in motion by a greater power, and is thrown up by a greater power, and is then left in a state of deposit, the water having lost its force; but then the next tide comes and takes it back again. The Chissel Bank is a constant succession of accumulations and reductions passing up and down by the sea and the stream. The overplus is this—every year the gravel below becomes finer and finer by the greater attrition than the gravel above—I know this, which is very material with reference to gravel and large matter in deep water; I know that in situations upon the coast of Cornwall. [*By the Committee.*—The heavy deposit must require the action of an impulsive power; and the indraught into that basin would not carry up to the point to which the attention of the Committee is now called any matter as heavy as sand. It would only carry the matter which would be held in suspension in water flowing at the slow pace which I speak of.] Where two streams meet there is a tendency for the material to be deposited—a tendency due to a variety of circumstances. My great object is to throw the greatest mass of scouring water on to that north wall, for that is the wall where there will be a tendency to accumulation, if any takes place. I have said the greatest tendency to deposit is upon the flood tide. Upon the flood tide the north pier is in greater eddy than the south pier—the great tendency therefore to deposit in that basin will be so (*describing the same*). I say that, inasmuch as I can discharge from the Birkenhead Fork the same quantity, or nearly, as I can discharge from the main fork by partially shutting those sluices and opening these, I can throw the whole mass of water over against that fork if there should be a tendency to silt up. The stream will go in a direction to the part where the chance of deposit is most probable; you have overlooked the fact that we discharge as much as we like from this fork, or from this fork, and if I found any accumulation was taking place at this corner, I should, as a matter of course, discharge chiefly from the sluices of the great dam. [*By the Committee.*—Supposing all the sluices to be opened, the velocity of the river, as I call it, as it leaves the basin and enters the Mersey with a high spring tide, would be six miles an hour; with the extreme of the tides it would be 6, with the medium tides it would be 5·4, and with the low tides it would be 4·8 miles an hour. I perfectly agree in the velocities with Mr. Hawksley; indeed, Mr. Hawksley has used a higher multiplier than I used originally, and I believe he was

Deposit at junction of currents.

Greatest velocity through low-water basin.

perfectly right. The only difference was, that Mr. Hawksley did not give the velocity at the entrance. We agreed perfectly at the forks.] *J. M. Rendel,* 2 June, 1856.
The velocity at the bottom of the 12 feet water will be about one-eighth less than what I have given, because I have given the mean velocity of the stream; assuming 12 feet dead water in the basin, there will be communicated to that water the velocity due either to the point of discharge, or the velocity at the point of exit, and all through it; that is to say, the water in the low-water basin will be running, varying according to circumstances, at the velocity of either three and a half miles an hour or six miles an hour; according to the paper handed in to you with the quantities of water stated therein; the motion on the bottom being about an eighth less than at the top; it varies with the bottom. The top would be a little more than the mean; about an eighth more. But you will see also, and Mr. Hawksley would have told you the same if you had pressed him as you have me, immediately a bar takes place you at once increase the velocity over that bar, because you diminish the sectional area. I did not hear the evidence of Mr. Mossman, from Hartlepool. I cannot imagine anything so extraordinary as that, upon the discharge of the sluices, there being an existing bank at the bottom, the discharged water should have swept a vessel then floating in the harbour out to sea, and not removed the deposit which existed at the bottom; but I can imagine this, that in Hartlepool harbour, where the quantity of water is comparatively small, and the channel for sluicing is not walled, so that the section of the river is undefined, I can readily imagine that something of that kind might take place, but it is not a parallel case. Hartlepool, compared with that low-water basin, is a ditch, and a very muddy one; there is a small channel through which the sluicing water goes. The material would be principally fine sand and silt; the silting in estuaries such as the Mersey is chiefly from the incoming tide. If you ask me if the delta of the Ganges comes chiefly from the land or sea, I should say chiefly from the land. The Nile also; but those are very different cases from the Mersey. The deposits in the mouth of a river depend very much upon the geological condition of the drainage area through which the water passes, and from which the water is derived, in the case of the Nile and the Ganges, but not in the case of the Mersey; that which the river brings down must depend upon the geological character of the country drained; but that which you find at the mouth of the river must depend upon that and something more. I cannot call the geological condition of the drainage area of the Mersey of a clayey description; it is more of a sandy description than a clayey; the whole district of the red sandstone formation there has clay upon it. In examining the Mersey I did not find any cementitious matter in the deposit; I did not find clay in the form which you suggest. I think if you take the deposit from the river almost in any part—but even take them from Runcorn, where you have less of salt-water deposit, and more of fresh—if you dry it you will find it is an impalpable sand.

Sluicing at Hartlepool.

Source of silt.

Origin of deltas.

J. M. Rendel, 2 June, 1856.

The deposit in the Woodside Basin would take some years before it was hard enough to walk on; I know it to be so, to my cost, for I sunk in there; that looks like fine silt, which is really sand. We must not misunderstand terms—ordinary sea silt and ordinary river silt is an impalpable sand, which, if you dry it, becomes a fine sand, which you can blow away. To give you an instance of it, I took up from 40 feet below the surface in the Humber some mud, to ascertain its character, and when dried it lost 33 per cent. of its weight, and became a mass of fine sand; that is the case with most of this mud. I do not say there is no slimy deposit—no cementitious deposit brought down and thrown up in the way of deposit; but I say that the proportion of that description of matter brought into the Mersey in the region of Liverpool, but particularly at Birkenhead, is so slight that it is not worth naming, in comparison with the quantity of sand brought in with the flood tide, and kept in suspension. On the Liverpool side, the docks fill up with the 360 tons of deposit per diem very easily indeed. In the first place, with reference to the basins, as I described to the Committee yesterday, immediately the tide makes into the mouth of the Mersey, if there is any wind up, it breaks over the sand banks whilst they are dry, and it carries from the sand-banks the finer and coarser particles of sand in proportion to the amount of sea; it carries it into the mouth of the Mersey; the flood tide comes up from the westward, and runs directly along the Liverpool shore; and, the basins being traps for the sand, the sand and mud get in from the waves in that way into the basins and into the docks. I believe those basins collect a very great deal more sand, from the circumstances I have referred to—that they are dry at low water, and, therefore, the waves enter them and throw up those sands. If, according to Mr. Hartley's view, the south reserve should be preserved for docks, the railways, the docks being brought up to them, would not be as well off as ever. I will show you why I do not think they would; I do not think Mr. Hartley could consistently with his plan enter docks except from the river. If there are entrances from the river, you cannot have deep sills, because you have no sluicing power. General craft docks in the south reserve, with sills that would suit them in addition to Mr. Hartley's plan, would be a most extravagant arrangement for the public, looking to it as a trust property; my own feeling has always been, as I told you yesterday, that the great object to be carried out is further dock extension is within the pool; I think so still; I have never altered my opinion. That need not be upon Corporation land. There is a large quantity of land within the float which does not belong to the Corporation; they have a large extent, but there is a very large amount of private property too. The first land on the south side is Corporation land, but the first land on the north side is not Corporation property. There are 3000 or 4000 acres of the finest land in the world for docks just above the Corporation land, about a mile and a half up there. I should not object to docks on both sides. The nearest is the side the public will come to first.

Character of the silt.

Source of sand in Liverpool Docks.

Railways inadequately accommodated.

Dock extension to be within the pool.

Re-examined by Mr. Webster.

J. M. Rendel, 2 June, 1856.

When I laid out the entrances, the north reserve was Crown property; there has never been any time until now when both reserves could be dealt with so as to make the best arrangement. At the time when Mr. Brassey's Bill was introduced, he was under contract to finish the works. Mr. Brassey's object was to get 140,000*l.* of money, instead of 140,000 yards of land; he was under contract to complete the works according to the authorised plan upon the wall. At that time it was distinctly understood that the Great Western Railway Company were to have access to the low-water basin. I had discussions with Brunel upon that very subject. Mr. Brunel came to me repeatedly about it, and he and I arranged the reconstruction of that bridge which has been referred to across the Morpeth Dock. According to the original plan, the Cheshire Junction Railway Company would have had the means of going to that south reserve upon the low-water basin; it was part of the original project that the railways should be connected with the south reserve, not by the railway companies, but by the Dock Trustees, for their own sake as well as for the railway companies. The south reserve was taken by Mr. Brassey, as part of the contract, from the necessities of the trust; the Crown gave to the Trustees, that is, to the public, the whole of the south reserve, for the express purpose of aiding the carrying out of the plan. The Bill of Mr. Brassey was not abandoned in consequence of threats of injunctions and proceedings from some Liverpool parties. Mr. Brassey having taken the initiative step of depositing the plan, the Dock Trustees had it under consideration whether they, for any purposes of their own, would proceed with the Bill. Mr. Drake advised them not to spend their money in keeping the Bill alive, but to wait until the Parliamentary fees would commence. Some parties at Liverpool, hearing that the Bill was kept alive, threatened the Trustees with an injunction; it was dropped because the Dock Trustees did not think it expedient or desirable to proceed. [*By the Committee.*—If my plan had been carried out, the Cheshire Railway Company would not have had a legal right of access to the south reserve; they would have had the right which commercial convenience would have given them. It was always my idea that they should have every possible facility, but that should be subject to an arrangement with the trust; they have not the legal right.] According to the original plan, the public, and the railway company as part of the public, would have had access to the low-water basin. It was a public quay all round the low-water basin, accessible from the shore. But the railway company would not have had the power of laying down rails without the consent of the Trustees. That access to the low-water basin which the Cheshire Junction Railway would have had was a material inducement to the Company to come here; there was no other object in the railway going there but to get to the low-water basin. It was for that they made the expensive line, which stops now at Bridge-end, at a cost of a quarter of a million.

Railway communication to south reserves and low-water basin.

2 June, 1856. The Committee-room was cleared.—After some time the counsel and parties were again called in.

The Chairman stated that the Committee had come to the following resolution: "The Committee consider the evidence that has been adduced places sufficiently before them the facts bearing upon the question involved in the preamble, and they are willing, accordingly, now to hear counsel, as well in explanation of the evidence given upon the part of the opponents, if by the opponents such explanation be thought to be necessary, as in reply on behalf of the promoters."

Mr. Hope Scott requested an adjournment till Thursday, to consider the course he should pursue, which was granted.

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5 June, 1856. *Thursday, 5th June*, 1856.

SIR WILLIAM CLAY, BART., IN THE CHAIR.

Comparative estimate. Mr. Webster, in accordance with the request of the Committee, delivered in the Comparative Estimate, spoken to by Mr. Rendel (*ante*, 419-421), of the cost of completing the Birkenhead Dock works according to the proposed and according to the authorised plans, showing 206,072*l.* as the saving on the works if executed according to the authorised plans, and 210,000*l.* as the value of land created by such works, making a difference to the public of 416,072*l.* in favour of the authorised over the proposed plans. (*See* opposite page.)

Mr. Hope Scott stated on behalf of the Corporation of Liverpool, that, having duly considered what fell from the Committee at their last meeting, he did not propose again to address them, but would leave the matter as it stood in their hands.

Mr. Calvert, on behalf of the opponents, stated that he proposed to follow the same course.

The Committee-room was cleared.

After some time the counsel and parties were again called in.

Preamble not proved. The Chairman stated that the Committee had resolved "That the Preamble of the Bill is not proved."

BIRKENHEAD DOCKS, SESSION 1856.

COMPARATIVE ESTIMATES for completing the BIRKENHEAD DOCK WORKS according to the respective Designs of Mr. RENDEL and Mr. HARTLEY.

MR. RENDEL'S DESIGN.	£	£
Money to be raised under Act of last Session, 1855	.....	500,000
Money to be raised under the Act now sought for		
Money to be expended under existing Acts.		
Deepening the Great Float:—30 acres at east end to 10 feet below the Old Dock sill, the remainder to 8 feet below that datum, per Mr. Hartley's estimate	138,000	
Walling to the north side of the Great Float £120,000		
Less walling done £39,739		
Corporation walls 25,000		
64,739		
	55,261	
		193,261
Removal of the large dam between the Great Float and outer works	This is included in the sum of £478,928, stated below.	
Road from Birkenhead to Seacombe	.....	4,232
Sewerage culverts at Seacombe	.....	8,858
Completion of south river wall, South Reserve	.....	30,668
		237,019
Works authorised under former Acts, and not included in the above estimate	.....	478,928
		715,947
Cost of Act, contingencies, &c.	.....	
CR.		
The value of the south Reserve and Bridge End land, reclaimed and filled to 27 feet on Old Dock sill, by the above-named works	.....	210,000

MR. HARTLEY'S DESIGN.	£	£
Money to be raised under the Act of last Session, 1855	.....	500,000
Money to be raised under the Act now sought for, 1856		
Money to be expended under existing Acts.		
Deepening the Great Float:—30 acres at east end to 10 feet below the Old Dock sill, the remainder to 8 feet below that datum	138,000	
Walling the north side of the Float—Mr. Rendel's estimate £120,000		
Less walling done £39,739		
Corporation walls 25,000		
64,739		
	55,261	
		193,261
Removal of the large dam between the Great Float and outer works	.....	5,000
Road from Birkenhead to Seacombe	.....	4,232
Sewerage culverts at Seacombe, as per Mr. Rendel's estimates	.....	8,858
Completion of the south river wall, South Reserve	.....	30,668
		242,019
Works to be made under the Bill now before Parliament	.....	680,000
		922,019
Cost of Act, contingencies, &c.	.....	

APPENDIX.

THE REPORT OF J. M. RENDEL,

Dated 25th Oct., 1843,

EXPLANATORY OF HIS DESIGN FOR EXTENDING THE ACCOMMODATION OF THE PORT OF LIVERPOOL, BY THE CONVERSION OF WALLASEY POOL INTO A FLOATING DOCK AND SCOURING RESERVOIR, FOR MAINTAINING A DEEP AND CAPACIOUS BASIN, ACCESSIBLE, AT ALL TIMES OF TIDE, TO THE RIVER MERSEY.

J. M. Rendel's Report, 25 Oct. 1843.

Accommodation in aid of Liverpool.

WALLASEY POOL, from its great capacity and admirable position, offers advantages for the extension of shipping accommodation in the Port of Liverpool of a very commanding description. Not in the shape of rivalry to the magnificent docks now in existence, or even hereafter to be made, but as affording those adjunct conveniences which the want of space and absence of natural facilities make unattainable in any other locality within the port.

Area of Wallasey Pool.

The area of Wallasey Pool, within its headlands, viz. within Seacombe Point on the north, and Woodside Point on the south, is about 340 acres. The borings made for this inquiry show that the entire creek once formed a deep low-water lake, but like all similar lakes in such localities, when left in a state of nature, it has become silted up, and will be entirely lost if not made available to shipping, and maintained by adequate funds.

Silting up.

Land water.

Warrington's Sluice, placed at the head of the Pool, discharges, in time of land floods, a quantity of water sufficient to keep open a narrow tortuous channel through it, which is notoriously becoming yearly worse, both for navigation and drainage.

General design.

The accompanying design (*a*) will show that I propose to construct a

(*a*) The design here referred to is the same in all its main features as the Plan sanctioned by Parliament, Session 1844, the alterations in this original design during the progress of the measure through Parliament relating only to matters of detail, as the substitution of a wall for an embankment next the Mersey, and enlarging and deepening the Woodside Basin for the accommodation of the coasters beaching in Wallasey Pool, and the raising the Woodside Pier for the shelter of that basin.

J. M. Rendel's Report, 25 Oct. 1843.

wall along the low-water margin of the river Mersey, from Seacombe Point to the head of Woodside Ferry Pier. This wall, practically speaking, will be parallel with the opposite defence wall of the Liverpool Docks. It will consequently have the effect of giving a truer current than now exists to the flood and ebb tides, in their passage through this part of the harbour; probably, therefore, it will be the means of deepening the channel on the Liverpool shore. Certainly it will prevent the further increase of Pluckington Bank northward.

Low-water basin.

About the middle of the wall I propose to leave an opening of 300 feet wide, as an entrance to a basin of upwards of thirty-seven acres area, excavated to a depth of twelve feet below low-water spring tides, walled with convenient wharfs, and in every respect made suitable as a place of refuge for the numerous vessels now so frequently obliged to seek shelter by running aground on the sand-banks which constitute its site; such a basin as this would obviously be a vast convenience added to the port for the accommodation of steamers, especially as they would be able to run to and from it at all times of tide, and obtain within it wharfage completely protected from wind, sea, and tides. The Irish Mail Packets would, it is manifest, resort to this basin, as the Birkenhead Railway (from London) would, of course, be extended along its wharfs, and the bags and passengers be passed without delay or inconvenience, from the railway carriage to the vessel.

Steamers and railway.

Dam and Floating Dock.

At the head of the basin, and as shown on the design, viz. extending across the Pool from the Patent Slip yard on the Birkenhead shore to the Smalt Works on the Seacombe shore, it is proposed to build a masonry dam, for the object of retaining in the Pool above a sufficient quantity of water to form it into a Floating Dock. Three communications are proposed between this float and the great basin, viz. a pair of gates seventy feet opening, one lock of fifty feet, and one of thirty feet, and the sills of each entrance to be not less than six feet below the Liverpool Dock datum.

Opening in dam.

Shores of Wallasey Pool.

Within this dam Wallasey Pool contains an area of upwards of 150 acres, and a frontage of 8000 yards lineal. The shores are flat, and in every other respect suitable for trading and commercial establishments, whilst the proximity of excellent sandstone quarries affords the means for the economical construction of wharfs and the like necessary conveniences.

Reservoir for scouring the basin.

Enormously large as this dock may be deemed for commercial purposes, it is not too large as a reservoir to contain water for scouring the basin, which is large and deep.

Scouring power.

The requisite scouring is proposed to be effected by a daily discharge of water equal to the difference between the level of the tide of the day and that at which it is to be permanently retained in the dock, and from which I think thirteen feet on the Liverpool datum would be most suitable. The discharge to be during low water, by means of adequate sluices through the dam, laid at the proper level for acting with the best effect.

My experience in such matters enables me to state with confidence

that the power derivable from so extensive a reservoir, taken in connexion with the great rise and fall of the tides in the Mersey, will be quite sufficient for the attainment of the object in view. The design cannot be more favourable for bringing all parts of the basin under the direct action of the scour of the sluices, whilst from their frequent use and the disturbance caused by the steamers and other vessels resorting to the basin, accumulations will be displaced before they have attained a solidity that would require further means for their removal.

J. M. Rendel's Report, 25 Oct. 1843.

Scour of basin,

Action of steamers.

As there would be no indraught till the flood tides had risen to the level of the water in the dock, the quantity of silt brought into the basin and dock would be very considerably less than is at present brought into the Pool, which is important with respect to the expense of maintaining the requisite depth for the dock and basin.

Silting in basin and pool.

As regards the loss of backwater which the Mersey will sustain in carrying out the design now proposed, it is to be observed, that a mere comparison of the quantities of cubic feet of water, at any given time, passing into and out of Wallasey Pool in its present and in its embanked state, would be a very superficial view of the question. At present the backwater passes off at a time of tide when it can have but little, if any, good effect, or scouring influence; when retained till low water, though the quantity discharged will be less than at present, the power gained will be vastly in excess and will be permanently secured, for, in reference to this point, I must repeat a remark already made, that the capacity of the Pool for backwater is yearly diminishing, and if left in its present neglected state, will, at no distant period, be entirely lost.

Loss of backwater.

Compensation for, secured.

The level at which it is proposed to retain the water in the dock will give a depth of nineteen feet just within the dam, and thirteen feet at Wallasey Bridge. This is in the present channel where it is deepest. The soil forming the bed of the Pool is now even of a kind to be dredged with facility, and the deepening of its whole area to an average of seventeen feet may be reasonably hoped for as an ultimate measure, seeing that the soil could be easily removed to, and used in raising and making marketable the 120 acres of land on the sides of the great basin.

Depth of water in float.

Deepening of float.

Reclamation of land.

As the permanent level of the water in the dock would be above Warrington's Sluice sill, a new outfall for that drainage must be made. This may be effected in several ways; as, for instance, by extending the drain along either shore of the Pool, and making a new sluice into the proposed great basin, or by a new sluice through the Leasowe embankment. By either plan the outfall might be considerably lowered and the drainage improved. The several small drains which empty into the Pool along its shores are so high as to admit of their discharging above the permanent level of the water in the dock.

New outfall for drainage.

In addition to the works already described, I have shown on the design a basin of nearly ten acres area, (*b*) immediately north of the present

Woodside Basin.

(*b*) This basin was increased to 16 acres to meet the requirements of the opposition on behalf of th coasters. See *post*, 8.

J. M. Rendel's Report, 25 Oct. 1843.

For coasters and ferry steamers.

Woodside Ferry Pier, and public or town slipway. This basin would amply accommodate, in safety, all the river and coasting craft that now, at some risk, discharge their cargoes whilst lying aground on the open sand-banks which constitute its site, and the strand or beach, which it includes, could be, from its then sheltered state, maintained in a perfect condition for the vessels to ground on. To the ferry steamers it would also be a great convenience.

(Signed)

JAMES M. RENDEL.

8, Great George-street, Westminster.
25th of October, 1843.

LETTER OF J. B. MOORE, CHAIRMAN OF THE LIVERPOOL DOCK COMMITTEE, TO THE LORDS CONSERVATORS OF THE MERSEY.

Dock-office, Liverpool, 20th May, 1844.

J. B. Moore's Letter to Conservators, 20 May, 1844.

MY LORDS,—On behalf of the Trustees of the Liverpool Docks, I beg leave to submit the following statement to your Lordships:

Works proposed.

1. That a Bill is now pending in Parliament for the construction of certain tidal basins and other works within the River Mersey, at Birkenhead, which works occupy the site of a creek, or inlet of that river, called the Wallasey Pool, and involve the damming up of the Pool itself, as well as the reclaiming of 120 acres at the mouth of it.

Grounds of opposition.

2. That the Trustees of the Liverpool Docks have opposed this Bill in Parliament on public considerations only, and they desire to represent to your Lordships that they do not oppose the construction of docks and other works at Wallasey Pool, provided they are so planned as not to injure or endanger the navigation of the port.

Injuring river.

3. That they have consulted engineers of eminence upon the proposed scheme, and they have been advised by them that it is likely to have a very injurious effect upon the navigation of the river, and especially upon the sea channels of the port, inasmuch as the ebbing waters of the Mersey are only now barely sufficient to keep open the outer channel, and the present scheme involves a diminishing of the volume of such waters to a very great extent.

Approval of public Boards.

4. That it has been alleged, in the course of the inquiry before the Committee of the House of Commons, to whom the Bill was referred, that your Lordships, as well as the Lords of the Admiralty, approve of the scheme, and have sanctioned it; and it has been continually urged by the promoters of the Bill, as well as by some members of the Committee, in the course of the proceedings, that such sanction and approval have determined the question, and ought to be conclusive.

J. B. Moore's Letter to Conservators, 20 May, 1844.

5. That the Dock Trustees are informed that it has been stated to your Lordships, as well as to the Lords of the Admiralty, that although the construction of the proposed works, and the reclaiming of land at Wallasey Pool, may diminish the quantity of water now flowing into the Mersey, yet that the water so abstracted may be compensated for by reserving a certain quantity, and discharging that quantity at a later period of the tide, when it is said it will be more effectual for the scouring and preservation of the sea channels.

Compensation for water displaced.

6. That the Dock Trustees have taken every means in their power to test the correctness of this last supposition, and they beg most seriously to assure your Lordships, that after the most careful consideration of it by many experienced engineers, they are convinced that the mode by which it is proposed to compensate for the water abstracted will be altogether unavailing, and that whatever diminution takes place in the tidal waters of the Mersey by reason of the proposed works, will be an absolute and entire abstraction of so much water from the scour of the sea channels without any compensation whatever.

Total loss of water displaced.

7. That they have been further advised that Wallasey Pool may be made available for providing additional dock accommodation in a manner more beneficial to the commerce of the port, and so as at the same time to increase rather than diminish the amount of tidal water in the river, and so as to be an advantage to the sea channels.

Increase of tidal water by another plan.

8. Under these circumstances, and especially as the alleged approval of your Lordships and the Lords of the Admiralty has been held out as being, in fact, the decision of the proper authorities, and therefore conclusive upon the subject, the Dock Trustees earnestly request that your Lordships will cause an inquiry to be instituted, in such manner as may be deemed expedient, as to the probable effect of those works upon the channels of the port, and that the opinion of the most eminent engineers, and of the other persons distinguished in science, may be ascertained before your Lordships' final sanction and approval are given, so that the whole matter may have that complete and entire investigation which its vital importance to the Port of Liverpool demands.

Further inquiry necessary.

9. That other objections exist having reference to the impracticability and injurious tendency of the proposed works, but it is the imminent danger to the sea channels of the port to which your Lordships' attention is particularly requested.

Danger to sea channels.

I have the honour to be,
My Lords,
Your obedient, humble servant,
(Signed) J. BRAMLEY MOORE,
Chairman.

To the Lords Conservators of the River Mersey.

REPORT OF CAPTAIN EVANS, R.N., ACTING CONSERVATOR, TO THE LORDS CONSERVATORS, OF THE MERSEY, IN REPLY TO THE LETTER OF J. B. MOORE, CHAIRMAN OF THE LIVERPOOL DOCK COMMITTEE.

2, Whitehall-place, London, May 29th, 1844.

Capt. Evans, R.N. Report, 29 May, 1844.

My Lords, — In compliance with your Lordships' instructions, I have examined the evidence given before a Committee of the Honourable the House of Commons on the Birkenhead Docks Bill, in order to ascertain if the objections to the proposed works, stated in a letter of Mr. Bramley Moore's to your Lordships, were sustained by eminent civil engineers.

After a careful perusal of the evidence *pro* and *con.*, I find it of such a conflicting nature, that I think I shall best meet your Lordships' views by a simple statement of the facts of the case, leaving your Lordships to draw your own conclusions.

Objections of Liverpool Dock Trustees.

The objections of the Trustees of the Liverpool Docks appear to me to be as follow, namely, that if the proposed works at Wallasey Pool be carried into effect, the abstraction of the water contained in the Pool will to a serious degree endanger the navigation of the River Mersey, but most particularly the sea channels of the port. This seems to me to be the vital question at issue. With reference to the proposed works, I think Mr. Moore's chief objection is easily disposed of, on the known principles of tidal action in estuaries.

Minimum section not altered.

In the first place, your Lordships will perceive, on reference to the plan, that the river wall to be constructed across Wallasey Pool does not contract or narrow the volume of water entering the estuary, inasmuch as Seacombe Point extends further into the river than the proposed wall.

Motion of tidal wave.

The tidal wave entering the narrows at Seacombe will, if confined by this wall, increase in velocity, and tend to keep the channels above and below Liverpool clearer of deposit than they are at present, for the following reason: when the tidal volume now passes the narrows at Seacombe Point, it suddenly expands into Wallasey Pool, thereby diminishing the velocity, and creating an eddy, which past experience, as well as the evidence of Mr. Tomkinson, shows will in the course of time silt up the Pool, with the exception of a narrow channel through it, sufficient to discharge the water of the land drainage.

Compensation from increase of velocity.

I do not think that, in approving of the plan of those works, your Lordships looked for compensation for the water abstracted from Wallasey Pool to any quantity that may be reserved in those works for the purpose of being sluiced out at a later period of the tide, for the more effectual scouring of the sea channels, as the quantity so sluiced out would be barely sufficient to carry away the silt with which it would be

charged; but that your Lordships were guided in your approval by the same motives that influenced your decision in favour of the Liverpool Dock Bill, namely, that the river wall would in both cases compensate for the displacement of the tidal water, by giving a more direct course and greater velocity to the tide, and thus improving the navigation of the river. *Capt. Evans, R.N. Report, 29 May, 1844.*

In the course of the evidence it has been asserted by some, and denied by other engineers, that an increased velocity in the narrows would force a greater quantity of water into the estuary above Liverpool; but as your Lordships, in approving of the plans for both sides of the river, never expected any compensation from such a source, I shall, as the subject has been mooted, simply state my views of the case. It is a well known fact, in all parts of the world, that a tidal wave, if obstructed or confined in its progress through an estuary, will increase in velocity, and rise in proportion, as the space it occupied before its contraction is to the space into which it may be forced; seamen find this law universal, but to those unacquainted with the theory of tides the river Severn and the Bay of Fundy afford convincing practical proofs of it; in both those estuaries we find a greater volume of tidal wave admitted at the entrance than at that of any other known estuary, and we also find that in its progress to the summit of both, the tidal wave is confined and obstructed; the result is well known, namely, that at Chepstow it is heaped up to 60 feet, and above Anapolis Royal to 75 feet. Effects of velocity in the narrows.

Spring Tides.

	FEET.		FEET.
Chepstow	60	Chignecto Bay	75
Lundy Isle	27	Grand Manan	25
Difference . . .	33	Difference	50

This shows that, in both those instances, the water is forced to more than twice the height at the summit of the estuary to what it is found to rise at the entrance, without taking into consideration the difference of level between the entrance and the summit. Increased height.

In stating these facts, I do not presume to say that similar results will take place in consequence of the increased velocity obtained by walling in Wallasey Pool, but I am quite certain that the increased velocity will compensate for the loss of water which the erection of docks on both sides the river will occasion; I think your Lordships will feel that I am justified in this conclusion, when I state that all parties admit in the evidence recently given before the Liverpool Dock Committee, that, judging from ancient surveys, the channels into Liverpool are in a better state at present than they ever have been, notwithstanding that your Lordships will perceive, by the accompanying chart, that in the construction of the Liverpool Docks 10,000,000 cubic yards of tidal water were displaced, the entrance of the river considerably contracted, and a pool similar to that of Wallasey dammed up. Compensation for water displaced. Water displaced by Liverpool Docks.

Capt. Evans, R.N. Report, 29 May, 1844.

I may here remark that the civil engineers of those days, as at the present period, informed the Liverpool authorities that if they constructed their docks, and made such encroachments on the river, the Port of Liverpool would be ruined.

Fortunately the Corporation took a different view of the case; and experience has shown that their river wall, by giving a greater velocity to the tide, has improved the navigation of the Mersey.

Coasters Basin.

I consider the objection in the evidence to the Refuge Basin for coasters to be well founded, and I attribute this to the deviation that has been made from the original plan I had the honour to submit for your Lordships' approval. The plan at present before the Honourable the House of Commons differs, as your Lordships will perceive, from that plan very considerably; making the basin, in this point of view, a *cul de sac*, exposed to the full force of the ebb tide, which rolls into it over the inclined plane of Woodside Ferry Pier, which, from its lowness, renders the entrance to the basin difficult of access with a strong tide either way. The basin is also considered too small for the accommodation of the numerous coasters which now take refuge on the banks at the entrance of the Pool; your Lordships will recollect that in my first Report on the Birkenhead Docks Bill I anticipated this objection, and I therefore now propose to your Lordships that a similar basin for the use of the coasters be constructed on the south side of the Woodside Ferry Pier, as shown in the accompanying plan, marked yellow, and that the pier itself, as originally proposed, should be raised to a level with the river wall, but not to project beyond it into the river. The wall of the southern basin to be run in the direction marked by a yellow line on the plan, so that in the event of its being continued at a future period to Birkenhead pier, it may present a continuous line.

Woodside Ferry Pier.

Additional basin for coasters.

River wall.

I find also in the evidence an objection to the alteration made in the line of the river wall between Seacombe and Woodside, which is in my opinion well founded. In the original plan before alluded to, your Lordships will perceive that the river wall ran in a straight line from Seacombe to Woodside, across the orifice of the Pool.

The plan now before the Honourable the House of Commons shows a projection in the centre at the north end of the tidal basin, which projection not only checks the tide, and diminishes its velocity, but also tends to silt up the basin: I should therefore recommend your Lordships not to allow of any deviation from the original straight line of the river wall, unless it be found from the borings to be physically impossible to construct it, in which case the wall might be built in the concave form I have shown on the plan, the versed line of the arc not to exceed 60 yards, *i. e.* the concave part not to recede more than 60 yards inside the original straight line.

To be straight or slightly concave.

Novel mode of sluicing.

A great portion of the evidence relates to the novel plan Mr. Rendel, the engineer of the works, has introduced for scouring the tidal basin; on this subject the greatest diversity of opinion exists amongst the most

eminent of the civil engineers, but as the plan has never been tried there can be no certainty as to its results, therefore I shall not trouble your Lordships on the subject more than by stating that Mr. Rendel's object, as appears from his evidence, is to keep up such a state of agitation as not to let sediment subside, but holding it in suspension until the ebbing tide allows it to escape out of the river. If his plan fails, then he will resort to the usual mode of dredging, but will not allow any material dredged out to be cast into the river. The effect which the water to be sluiced into the river by this novel plan may have on the general scour, is described in a great variety of ways by the civil engineers; but as I have already informed your Lordships, it will be of very little use as a scour, owing to its being so charged with silt; for thus the benefit which the additional volume of water might cause to the scouring effect of the ebb tide, will be neutralised by the deposit of the silt it contains, as occurs in scouring out the tidal basins of Liverpool.

Capt. Evans, R.N. Report, 29 May, 1844.

Suspension of the silt.

It is stated by some of the civil engineers that projections on the Cheshire side of the river would cause a deposit in front of the Liverpool Docks, but from the straight course of the river in that part of it, projections cause a deposit on the side on which they are; the engineers themselves prove this, for they state that Pluckington Bank, on the Liverpool side, is occasioned by the projection of the Knotts Hole Rocks on the *same* side, and by reference to page 15, paragraph 53, 54, of the acting Conservator's Report, your Lordships will see that Captain Fitzroy, in alluding to this subject, expresses the same opinion.

Deposit in front of Liverpool Docks.

Mr. James Walker, the civil engineer, states that the proposed tidal basin at Wallasey Pool, the engineering principle of which he finds no fault with, might be constructed without continuing the river wall across the whole orifice of the Pool, but merely enclosing a sufficient space on each side of the basin for the convenience of commerce, leaving the remainder open, as at present, for the use of the coasters and small craft.

Mr. Walker's plan.

Were Mr. Walker's plan adopted, the benefit to be derived from a continuous river wall, as I have already described, would be lost, and the same sudden expansion of the tidal volume as at present exists, after passing the narrows at Seacombe, would take place, with this additional consequence,—that as soon as the tidal volume arrived at the projection in the centre of the Pool it would be stopped, a reaction take place that would check the tide, and the space at both sides the projection rapidly silt up.

Mr. Walker states, and every engineer agrees on this subject, that there is no place in Liverpool where docks could be made without abstracting water; and Mr. Page's late experiments on the set of the tides, which I myself witnessed, prove that it is the water on the Liverpool side that passes through the Victoria Channel,—all his floats from Wallasey Pool having passed out of the Rock Channel or over the banks. These facts are very material, as it appears that, independent of

Water through Rock and Victoria Channels.

Capt. Evans, R.N. Report, 29 May, 1844.

the beneficial effects, as already described, attending a continuous river wall along the front of Wallasey Pool, it will prevent any further displacement of water ever taking place, should the necessity of commerce require dock extension at Birkenhead, as all docks hereafter made at that place will *add* to the water space, for they *must* be made within the line of the river wall, where there is ample room, and the ground peculiarly adapted for such purposes.

Improvement of the navigation.

In conclusion, I beg to inform your Lordships that I see nothing in the evidence to induce me to alter the opinion I gave on a former occasion to your Lordships, respecting both the Liverpool and Birkenhead Dock Bills, as I feel convinced, if they be constructed according to the plans originally approved of by your Lordships, the works will improve the navigation of the river, particularly as I understand the promoters of the Birkenhead Docks have not only inserted a clause in their Bill

Deposit for silt and mud.

preventing any person throwing into the River Mersey any of the silt dredged out of their docks or basins, but have also expressed their willingness to accept all the silt the Liverpool Dock Trustees may send them, and dispose of it in the rear of their river wall, thus settling the difficult question respecting the dock mud.

I have the honour to be, my Lords,

Your Lordships' most obedient, humble servant,

GEORGE EVANS, CAPT. R.N.,

Acting Conservator.

To the Right Hon. the Lords Conservators of the River Mersey.

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C. WHITING, BEAUFORT HOUSE, STRAND.